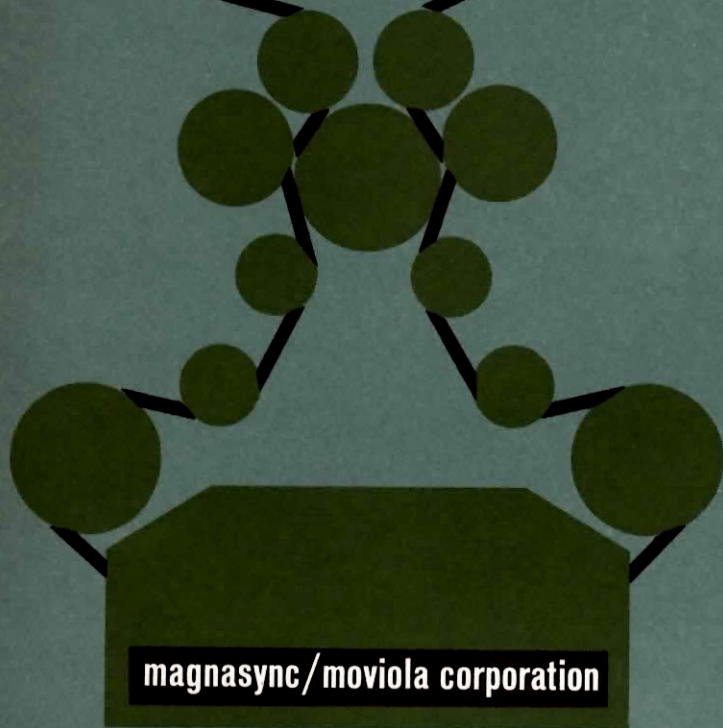


SOUND RECORDING SYSTEM



magnasync/moviola corporation

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moviola

CATALOG NO. S-103

2200 SERIES MODEL DESIGNATION SHEET

In order that we may fill and ship your order to your specific needs, we have prepared this simple method of ordering for your convenience.

SERIES	FILM SIZE	TRACK LOCATION	ERASE ATTACHMENT	EQUIPMENT TYPE NUMBER	EQUALIZATION
Solid State	16mm 17.5mm 35mm	E Edge C Center A Academy A3 Academy 3 track A4 Academy 4 track R Release print S Special	X in this position denotes erase head included	2. For rack mounting: Less Monitor Amp. & Mixing Amp. 3. For rack mounting to include Monitor Amp. 4. For rack mounting to include Monitor Amp & Mixer Amp. 6. In portable case: To include Monitor Amp. 7. In portable case: to include Monitor Amp & Mixing Amp. 11. Single unit reproducer. 11-1. Single unit reproducer to include Line Amp & Play Amp modules and output transformer. 22. 2 unit reproducer mounted in rack with electrical interlock. 33. 3 unit reproducer mounted in rack with electrical interlock.	A. 16mm S.M.P.T.E. B. 17½ — 35mm U.S.A. Std. C. 16mm C.C.I.R.

22 16 E X 7 A

Your selected Model is: **22-16-E-X-7-A**

SOUND RECORDING SYSTEM



CATALOG NO. S-103

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MODELS, SPECIFICATIONS, AND ACCESSORIES SUBJECT TO CHANGE WITHOUT NOTICE.

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STANDARD AND SPECIAL DRIVE MOTORS

Magnasync recording and reproducing equipments are equipped with 115-volt 60-cycle drive motors. There is no additional cost for equipping a new Recorder or Reproducer with a special drive motor for various other cycles, voltages or phases.

To operate the units at specific feet-per-minute, 24-frames-per-second equipment should be ordered by just noting motor code number on your order. However, 25 frames-per-second equipment should be designated by placing "-25" after the special motor code order number, such as: 5113-25, which would designate a drive motor of 50 cycles, 115 volts, single phase operating at 16mm speed for 25 frames-per-second. There is, however, an additional charge for equipping a 60-cycle unit to operate at 25 frames-per-second. Contact Magnasync/Moviola.

CYCLES	VOLTS	PHASE	FILM FPM	MAGNASYNC ORDER CODE NO.
60	115	1	36	6113
60	115	1	90	6119
60	230	1	36	6213
60	230	3	36	6233
60	230	1	90	6219
60	230	3	90	6239
50	115	1	36	5113
50	230	1	36	5213
50	115	1	90	5119
50	230	1	90	5219
50	230	3	36	5233
50	230	3	90	5239

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Series 2200

SOLID STATE RECORDER

*16mm, 17.5mm or 35mm
synchronous magnetic film*

The Series 2200 Recorder is a unique combination of the latest solid state technology and the unparalleled ruggedness and reliability of the time-proven world-famous Magnasync transport mechanism. It is available for all standard film speeds and voltages for complete international compatibility.

The type 7 has four channel input capability. Extremely versatile input switching circuits allows use of three low or high level microphones and line, or up to four line inputs.

Input and output transformers on all channels for complete circuit isolation and minimum noise. Construction is modular plug-in. Critical active circuits (amplifiers, power supply, etc.) accessible from the front panel; instantly serviceable. The unique "sliding" head cover permits sync marking directly over head gap.

The modular design flexibility of this recorder permits combination with other existing units such as Magnasync's tube type equipment, and virtually all other tube equipment on the market . . . thus allowing users of tube equipment to gradually acquire a complete Magnasync/Moviola Solid State System at a minimum amount of immediate cost.

Uncompromising performance integrated with professional human engineering and contemporary, functional design have been united to produce a truly refined, high-performance package for **any** producer!

There is no better magnetic film recording system on the market today . . . regardless of price!

See other side for features and specifications



Series 2200 Type 7

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moviola

FEATURES

Transport accepts any head configuration for 16mm, 17.5mm or 35mm in any track configuration up to 6 tracks on 35mm.

Constructed on precision-ground plate for optimum film motion.

Front panel adjustment of compliance arms for any film stock.

A-B wind switch, accommodates either "A" wind or "B" wind film stock.

Pushbutton reset footage-counter.

Provisions for remote control of drive motor.

Accepts, via remote control plug, transfer interlock from 1/4" tape.

Precision-ground sub-plate accepts any combination of Magnasync synchronous drive or interlock selsyn motors in tandem for special speed ratios, e.g.: 24/25 fps.

Three head positions available. Erase, Record, Play.

Heads removable and replaceable without adjustment.

New, improved shielding between heads.

Pre-aligned head assembly for easy change-over.

"Sliding" head cover for instant cueing access.

All plug-in solid state electronics.

4-channel capability.

Easy front access to circuit boards, fuse, meter adjustment, etc.

Large VU meter.

5-watt monitor amplifier.

SMPTE standard performance.

Erase head available on request.

SPECIFICATIONS

Frequency Response:

50 to 10,000 Hz ± 2 db at 36 or 45 fpm.

50 to 13,000 Hz ± 2 db at 90 fpm.

Distortion: Less than 2% total harmonic.

Signal-to-Noise Ratio: 58 db.

Inputs: Three low impedance microphones. (50/250/600-ohm XL connector) with high gain/low gain switch and one 50/250/600-ohm line input. Microphone inputs may be switched to provide up to four line inputs. Phone jack provision for HI-Z microphone input. (Type 7 only.)

Microphone Input Gain: 95 db. (Type 7 only.)

Microphone Input Noise: At least -120 dbm equivalent input noise or better. Typical -125 dbm. (Type 7 only.)

Line Input Level: -20 db to +15 db.

Output: Line output 600/150 ohms balanced or unbalanced, +20 dbm maximum level, 0 VU normal. A FILM-DIRECT switch connects the output to the recorder input or film playback as desired.

Monitors: 4 1/2" V.U. meter monitors the input signal during record and the output signal during playback. Integral 5-watt monitor amplifier and 5" x 7" speaker. Front panel phone jack for headphone monitor.

Dialogue Equalization: Switch for normal or high-pass filter with bass roll-off below 300 Hz. Response of -10 db at 100 Hz.

Flutter and Wow:

0.08% maximum rms, 36 or 45 fpm.
0.06% maximum rms, 90 fpm.

Film Capacity: Standard 1200-ft. reels. (2 Magnasync/Moviola reels furnished with each recorder.)

Take-up and Rewind: Two torque motors for high speed rewind from reel to reel.

Footage Counter: Directly coupled to film drive sprocket for accuracy; adds forward, subtracts reverse; instant reset.

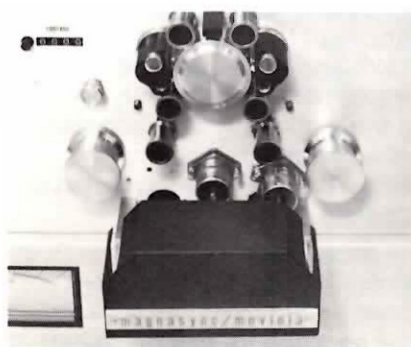
Drive Motor: Salient pole synchronous. Standard unit furnished with 115-volt, 60 Hz, single phase, 24 fps drive motor. Drive motors with other voltages, cycles and phases available including 25 fps film speed at 50 Hz, at no additional cost.

Power Requirements: 130 watts, 115 volts or 230 volts, 60 Hz or 50 Hz.

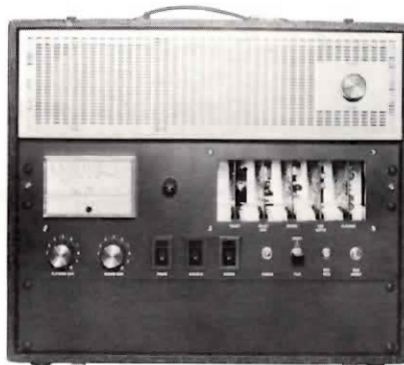
Size: outside case dimension: Mechanical unit - 17" high, 20" wide, 14" deep. Amplifier unit - 17" high, 20" wide, 14" deep. (Type 6 & 7)

Panel Space: 15 1/4" high, 19" wide (each unit).

Weight: Film Transport, 59 1/2 lbs. Electronics with 4-channel Mixer, 45 1/4 lbs. (Type 7)



"Sliding" head cover for instant cueing access.



Easy front access to circuit cards, fuse and meter adjustment. Amplifier unit available without Mixer.



Precision-ground sub-plate accepts combinations of Magnasync synchronous drive motors and interlock selsyn motors in tandem for special speed ratios, e.g.: 24/25 fps.

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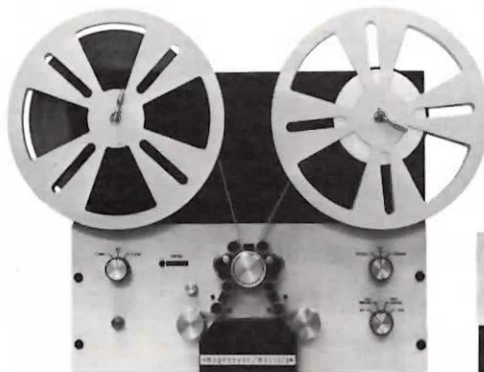
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2200 SERIES SOLID STATE RECORDERS

16mm, 17.5mm or 35mm synchronous magnetic film

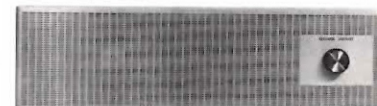
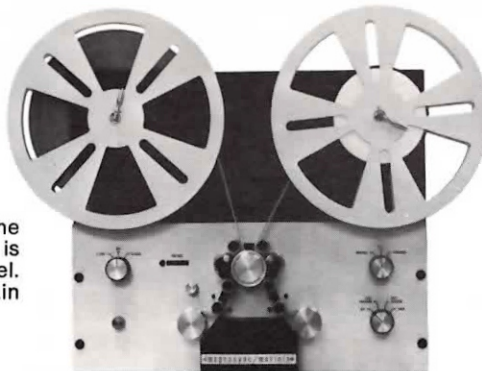
TYPE 2

for standard 19" rack mounting. Mechanism and amplifier specifications are same as the standard 2200 Series. Two and three channel models are available. Specifications and prices on request. Mechanical unit 15 3/4" high by 19" wide. Amplifier unit 7" high by 19" wide. Weight 62 1/2 lbs. net.



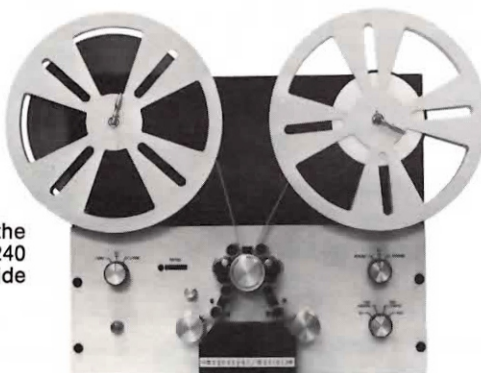
TYPE 3

Same as Type 2 with the addition of the Monitor Amplifier Model 2251, which is mounted on 5 1/4" high by 19" wide panel. Amplifier derives its power from main record reproduce amplifier chassis. Weight 66 1/2 lbs. net.



TYPE 4

Same as Type 3 with the addition of the four channel Mixing Panel Model 240 which is mounted on a 3 1/2" by 19" wide panel. Weight 71 1/2 lbs. net



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SERIES 2200

SOLID STATE REPRODUCER

16mm, 17.5mm or 35mm synchronous magnetic film

The Series 2200 Reproducers are comprised of the same basic mechanism and electronics as the Magnasync/Moviola Series 2200 Recorder. Modular "building block" design enables producer to expand his system from one channel to four, simply by means of plug-in modules. Add up to four transports in each rack cabinet.

Systems are available with electrical interlock; edge, center or USA tracking.

All reproducers are equipped ready-to-go and system-tested at factory.

FEATURES

- Transport accepts any head configuration for 16mm, 17.5mm or 35mm configuration.
- Constructed on precision-ground plate for optimum film motion.
- Front panel adjustment of compliance arms for any film stock.
- A-B wind switch, accommodates either "A" wind or "B" wind film stock.
- Pushbutton reset footage-counter.
- Provisions for remote control capability.
- Precision-ground sub-plate accepts any combination of Magnasync synchronous drive or interlock selsyn motors in tandem for special speed ratios, for example 24/25 fps.
- Provision for sprocket inching knob (optional).
- Provision for three heads.
- Heads removable and replaceable without adjustment.
- New, improved shielding between heads.
- Pre-aligned head assembly for easy change-over.
- "Sliding" head cover for instant cueing access.
- SMPTE standard performance.

SPECIFICATIONS

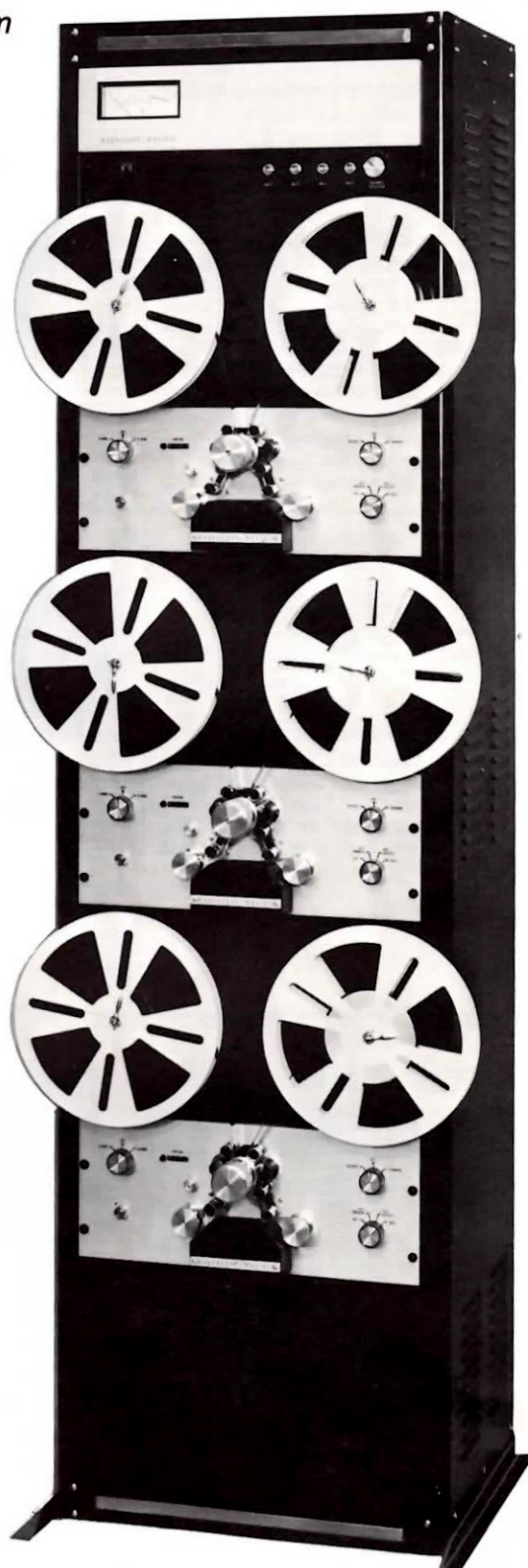
Number of Channels: Optional — One, two, three or four by means of plug-in modules.

Panel Sizes: Mechanical, 15 $\frac{3}{4}$ " x 19"; Electrical, 7" x 19".

Power Consumption: 115 volts or 230 volts, 60 Hz or 50 Hz approx. 125 watts per transport.

Output: Standard 600/150-ohm balanced line +20 dbm max. Output level of each channel adjustable on the front panel.

Output Metering: VU Meter monitoring of each channel selected by front panel selector switch.



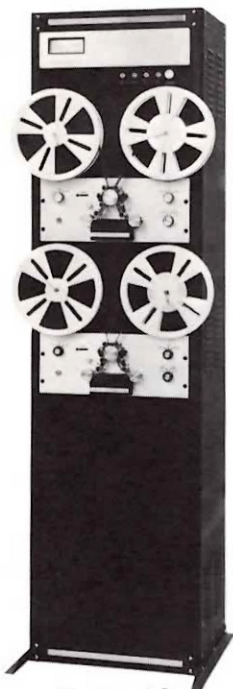
Type 33

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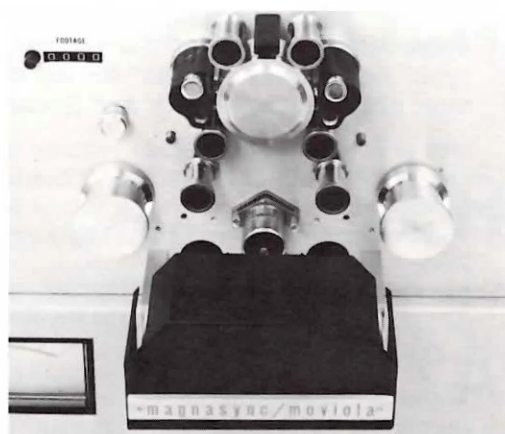
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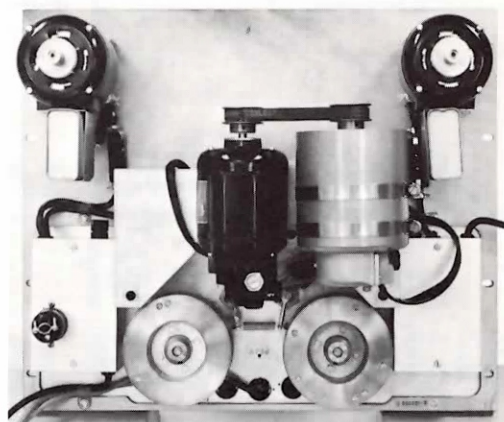
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Type 22 filler panels optional



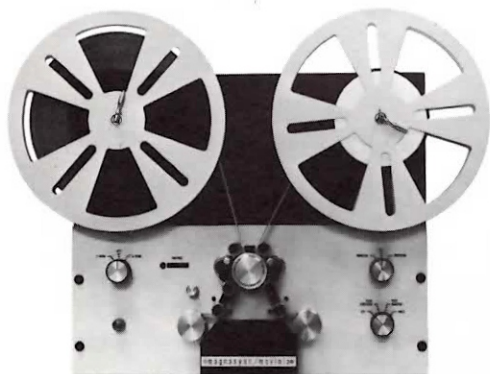
"Sliding" head cover for instant cueing access.



Interlock motors are installed in back of Transport panel.

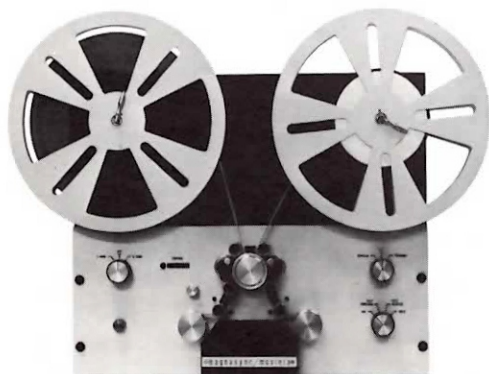
TYPE II

Single 2200 Series Reproducer which includes 2200 mechanism and basic amplifier Model 2244-1. Mechanical unit is 15 $\frac{3}{4}$ " high by 19" wide. Amplifier is 7" high by 19" wide. Weight 62 $\frac{1}{2}$ lbs. net.



TYPE II-1

Used when adding to existing Type II. This unit includes 2200 mechanical unit, one LA 22 Line Amplifier, one PB 22 Playback module and one plug-in output transformer. For interlocking equipment required, see Page No. 21. Weight 44 $\frac{1}{2}$ lbs. net



**LA
22.**



**PB
22.**



**OUTPUT
TRANSFORMER**

When ordering all above equipment, please specify power, tracking and equalization required.

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SOLID STATE DISPLACEMENT RECORDER

*makes single-system
editing possible*

Model 2300



*Dimensions: 21¾" wide, 15¼" deep,
28¾" high.*

Weight: 100 lbs.

The Masnasync Model 2300 Displacement Recorder automatically re-positions the sound track of a processed 16mm single-system release print film to "editor's sync" . . . sound and corresponding picture "in line" . . . for rapid, accurate editing, and then automatically re-positions sound track to "printer's sync" or "projection sync" for immediate projection, most often required by TV and Documentary producers.

Use of the 2300 eliminates the need for equipment associated with conventional, double-system transfer of 100 mil original magnetic sound track to a second 16mm magnetic sound track. One Displacement Recorder and a viewer equipped with magnetic head are the only units required. "In line" editing eliminates "lip-flap" . . . unwanted or unassociated picture sound.

The unit may be interlocked with other magnetic film recording equipment and projectors including conventional TV chain projectors. An audio input is provided to permit addition of sound to unrecorded release print film, and a playback audio output is provided for projection tracks.

The 2300 circuitry is modular plug-in solid state. Monitor speaker and headphone output are provided.

SPECIFICATIONS

Film Type, Tracking: 16mm 100 mil magnetic stripe motion picture film.

Film Capacity: Standard 1200-foot reels.

Take-up and Rewind: Two torque motors for high speed rewind from reel to reel.

Footage Counter: Directly coupled to film drive sprocket for accuracy; adds forward, subtracts reverse. Instant reset type.

Drive Motor: Salient pole synchronous. Standard unit furnished with 115-volt, 60 Hz, single phase, 24 fps drive motor. Drive Motors for other voltages, frequency and three phase are available.

Frequency Response: 50-10,000 Hz, ± 2 db at 36 fpm.

Distortion: Less than 2% total harmonic.

Signal-to-noise Ratio: 50 db minimum.

Flutter and Wow: 0.3% maximum rms at 36 fpm.

Auxiliary Record Input: 10,000-ohm bridging unbalanced, -15 db to +20 db level.

Outputs: 600/150-ohm balanced or unbalanced, +20 dbm maximum. Safe-print output jack on rear of chassis, approximately 0 db unbalanced.

Monitor: 4½ inch V.U. Meter with switch to select Record, Playback or Bias Monitoring from the front panel. Headphone monitor jack on the front panel for phones 600 ohms or higher.

Power Consumption: Amplifier — 10 watts maximum. Transport—125 watts maximum at 115 volts, 60 cycles.

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"MOVIOLA 50"

PROFESSIONAL 16mm TABLE VIEWER

Representing fifty years of experience in the field of editing, it is engineered to provide maximum operator comfort and efficiency. All parts are easily accessible for instant serviceability.

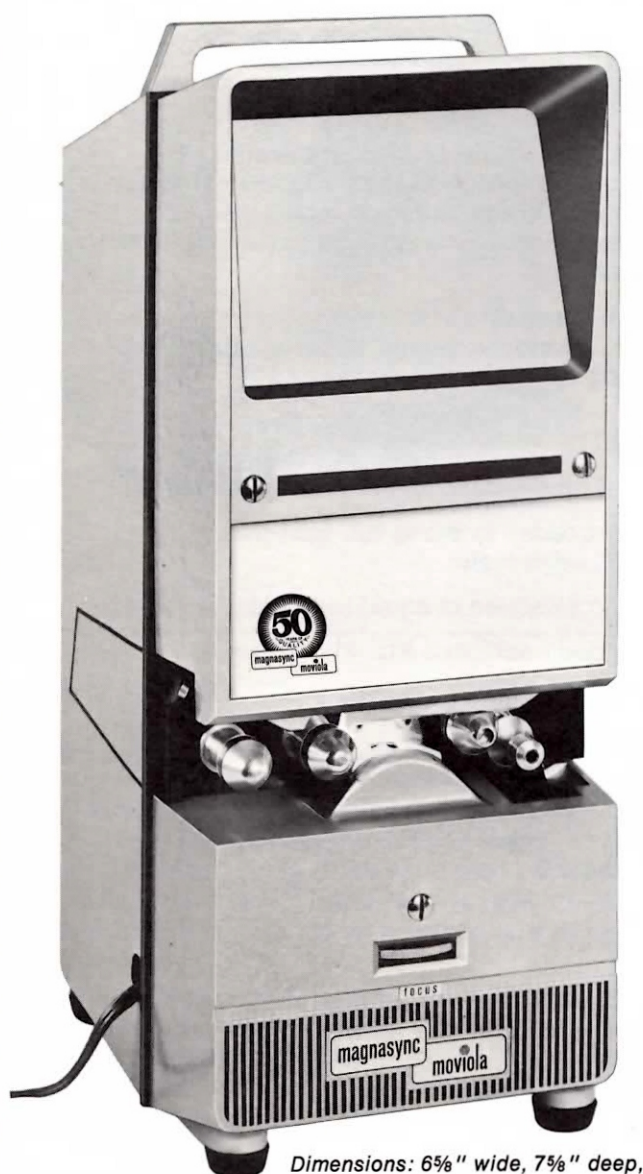
It accepts a standard version 16MM film, from left to right sprocket holes back. Its most outstanding feature is an eight-sided precision optical prism which gives a steady, flicker free picture. The high quality six-element lens projects a clear image, which remains sharp whether film is moving or stopped.

Ball Bearings on prism and sprocket allow the film to be pulled through up to five times the sound speed without scratching the surface or damaging the sprocket holes. Another feature is the quick load and unload capability. The film is clamped to the sprocket, not to lose sync. The same clamping motion relocates the guide rollers for quick, straight line loading or unloading. The open position of the clamp switches the projection lamp off.

The viewer can be used in connection with a Magnasync/Moviola Synchronizer to produce optical or magnetic sound on the same strip as the picture or in synchronization with a separate tape. The synchronizer can be equipped with footage/frame or timer counter. This viewer can be adapted with a magnetic head to pick up sound at the projected frame, which makes single-system editing possible when used with a Magnasync/Moviola Displacement Recorder, DR-1.

"In line" editing eliminates "lip flap" and unwanted or unassociated picture sound. The viewer is equipped with a standard wide-angle screen or with a fresnel lens screen offering concentrated corner to corner brightness.

For very bright editing rooms, a slip-on hood is available.



Dimensions: 6 $\frac{1}{2}$ " wide, 7 $\frac{1}{2}$ " deep,
14 $\frac{1}{2}$ " high Screen, 5" wide.



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Model 2516-E-N for 16mm
 Model 2517-A-N for 17.5mm
 Model 2535-A-N for 35mm
 3" NAB Hubs Available on request
 Overall rack size 66½" high
 22" wide
 17¼" deep
 1800 Transport Panel 17½" x 19"

SOLID STATE TRANSFER SYSTEM

16mm, 17.5mm or 35mm synchronous magnetic film

Series 2500

The Series 2500 Transfer System consists of a heavy-duty quarter-inch magnetic tape reproducer, a solid state sync pulse amplifier, and a sprocket magnetic film recorder/reproducer, all mounted in a rack cabinet.

This system is capable of transferring a pre-recorded, sync pulse, quarter-inch tape to sprocketed film without tying up the field recorder.

FEATURES

- Designed for continuous, heavy-duty operation.
- Allows producer to make full field-use of recording equipment.
- Automatic selection of equalization for tape speed.
- Three-speed operation: 3¾, 7½, 15 ips.
- Pushbutton controls.
- Dual capstan drive.
- 10½" reel capability.

See Page 4 for Specs on
Sprocket Drive Equipment

SPECIFICATIONS

Magnetic Tape Transport: Magnasync/Moviola's Series 1800 Magnetic Tape Transport unit is adapted to accept special (i.e., Nagra or other) reproduce heads and necessary preamplifiers. This tape transport is the heavy-duty dual capstan (low flutter) 3-speed, 10½" x ¼" capacity unit.

Sync-Pulse Amplifier: The unit used in this system is Magnasync/Moviola's solid state Model SP/60S sync-pulse amplifier which is capable of driving the film transport's synchronous sprocket drive motor.

Film Recorder: The film recorder used in this system is Magnasync/Moviola's Series 2200 Type 3 unit.

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moviola

X-400 RECORDER



16mm only, synchronous magnetic film

X-400 TYPE 15

The "ALL-IN-ONE" Type 15, in a single portable case, is a complete, top-quality sound system. Play-back monitor amplifier, loudspeaker and recorder are all built into this one compact package. Just open the case and you're in business! Designed for "on-the-go" producers who want to save set-up time.

FEATURES

- Accurate, easy-to-read footage counter.
- Two torque motors, for take-up, rewind, fast forward.
- Simplified single-switch for all motor control functions.
- Simultaneous film monitor from separate play head.
- "RECORD" indicator lamp to protect 'takes.'
- Accommodates standard 1200-ft. film reels.
- Bias indication readout.
- SMPTE standard performance.

SPECIFICATIONS

Film Type, Tracking, Model Numbers:

- 16mm, Edge Track; Model X-400-E-15
- 16mm, Center Track; Model X-400-C-15
- 16mm, Release Print, Model X-400-R-15

Film Capacity: Standard 1200-ft. reels. (2 Magnasync reels Models M-77B furnished with each recorder)

Take-up/Rewind: Two torque motors for high speed rewind from reel to reel.

Footage Counter: Directly coupled to film drive sprocket for accuracy; adds forward, subtracts reverse; Instant reset type.

Drive Motor: Salient pole synchronous. Standard unit furnished with 115-volt, 60 Hz, single phase, 24 fps drive motor. Drive motors with other voltages, frequency and 3 phase are available. See "Special Motors" Section for data.

Frequency Response:

50 to 10,000 Hz: ± 2 db at 36 fpm.

Distortion: Less than 2% total harmonic.

Signal-to-noise Ratio: 56 db.

Flutter and Wow: 0.15% maximum rms overall.

Inputs: High gain microphone channel. (Strapped for 50 ohms standard. Can easily be changed to 250 ohms or 600 ohms.) Cannon X-L connector. Hi Impedance input.

Output: Cathode follower (.6 volt into 600 ohms)

Dialogue Equalization: Switch for low frequency roll-off from 300 cps to -10 db at 100 cps.

Monitor: $3\frac{1}{2}$ " VU meter monitors input signal. Built in monitor speaker and power amplifier with provision for auxiliary speaker output, 4 to 8 ohms with 2 watts of power. Monitor output will feed any impedance above 500 ohms. Monitor direct through amplifier or switch to "Film Monitor" for simultaneous playback from film. Head phone monitor only in record position.

Power Consumption: 125 watts maximum.

Case Dimensions: 18" high, 20" wide, 11" deep.

Weight: 60 lbs. net.

ACCESSORIES:

M-480-A, Selsyn interlock.

M-98, Remote control.

(See "accessories" section)

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Model 962

SOLID STATE *Studio Mixing* **CONSOLETTTE**

The Series 900 studio mixing consolette, featuring solid state circuitry and modular cabinet and component design, is capable of fulfilling the requirements of **any** studio . . . from the smallest to the largest.

OPTIONAL FEATURES

- Up to 12 microphone or line inputs.
- Complete equalization with echo send and cue on any input channel.
- Up to 4 program output channels with large illuminated VU meters.
- Echo channels as required.
- Cue channels as required.
- Patching or illuminated pushbutton channel and cue switching.
- Sennheiser condenser microphone input.
- Headset monitor.

SPECIFICATIONS

Frequency response (in flat position): ± 1 db from 30 to 20,000 Hz at any level up to an output of +30 dbm.

Noise: Equivalent to an input signal of -120 dbm, unweighted. (20-20 KHz).

Distortion: Less than 0.5% THD at +30 dbm output.

Program Output: +30 dbm maximum into a 600-ohm load.

Source Impedance: 50 or 200-ohm microphone and 600-ohm line.

Input Impedance: Nominally 5 times rated source impedance.

Output Impedance (all outputs): 600 ohms balanced or unbalanced.

Output Isolation: Over 70 db between echo, cue, and program output.

Power Requirements: All power supplies self contained. Input 115V, 50 watts.

Amplifier Type: All solid state

Dimensions: 14½" high, 39½" wide, 29" deep.

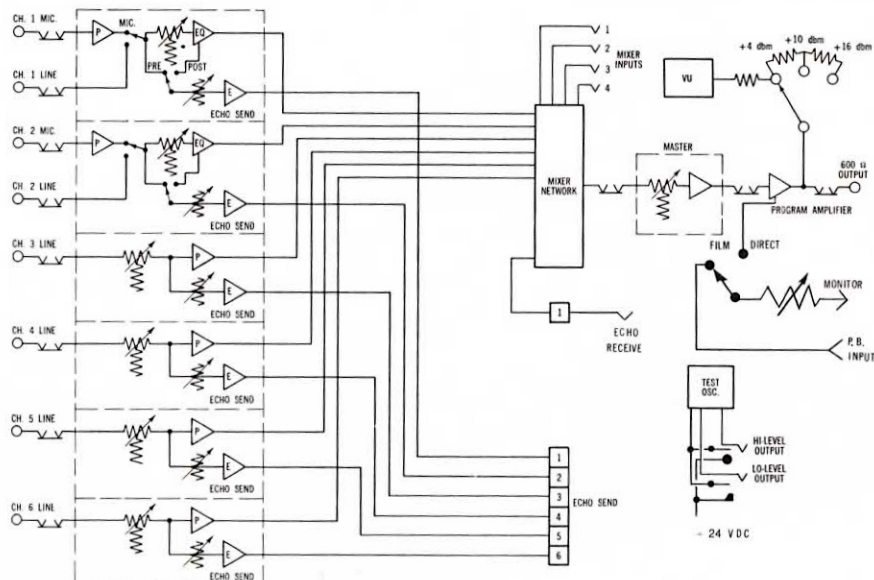
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Model 962 CONSOLETTA WIRING DIAGRAM



MODEL G-963 STUDIO MIXING CONSOLETTES

*Specifically designed for motion picture
re-recording applications*



A miniaturized studio mixing console with six input channels and patch bay.

Up to three plug-in microphone pre-amplifiers may be optionally substituted for three line inputs. Line amplifier has input and output level attenuation controls; "Film-Direct" monitor switch with film gain control. Matching blank panels are provided for custom additions.

Modular construction of cabinet and components, optional plug-in microphone pre-amplifiers, and hinged top door for complete accessibility to all components.

SPECIFICATIONS

Frequency Response: 30 to 15,000 Hz, ± 1.5 db.
Signal-to-noise Ratio: 70 db below program level.
Distortion: 0.5% total harmonic.
Output Level: 20 dbm maximum.
Power Consumption: 75 watts.
Size: 34½" wide, 14" high, 24" deep.

ACCESSORIES

Model S-801 Microphone Preamplifier. Up to three can be used, wired for 50-ohm input or strapped for either 250 or 600 ohms.

Model G-971 Reference Level Oscillator. May be added in place of one of the blank panels. When keyed, oscillator injects a 800 Hz tone to output line at +4 dbm level.

Model G-970 Talk-back Microphone. When keyed, affords talk-back from "mixer" to the "recordist."

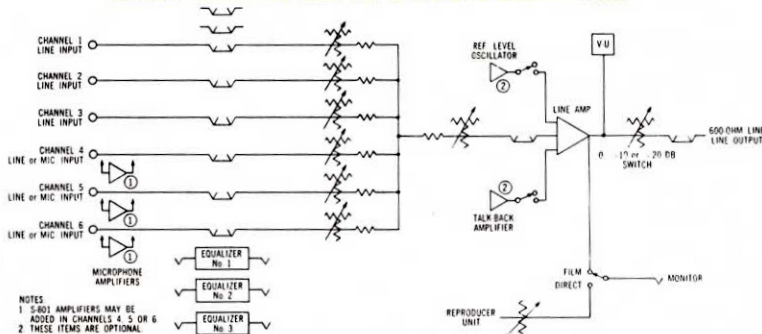
Model G-967-R Right Hand Extension. Provides 19" x 8¾" panel space for mounting equipment such as M-790 Distributor control, PA-40 Monitor Amplifier, special filters, equalizers, etc.

Model G-967-L Left Hand Extension, as above.

The G-963 consolette includes the following:

- 1 — G-700 Line Amplifier
- 1 — G-803 Equalizer (three channel)
- 1 — G-860 Ladder Attenuator Panel
- 1 — G-900-1 Patch Panel (with 2 extra jacks for auxiliary equipment.)
- 1 — G-900-2 Control Panel
- 1 — G-900-3 Power Supply
- 1 — G-900-4 Input-Output Panel
- 3 — G-900-5 Input Panels (can be replaced with S-801 Microphone Pre-amplifier as an optional accessory, channels 4, 5 and 6).

G-963 CONSOLETTA BLOCK DIAGRAM



NOTES

1 S-801 AMPLIFIERS MAY BE ADDED IN CHANNELS 4, 5 OR 6

2 THESE ITEMS ARE OPTIONAL

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Model 250

SOLID STATE

portable four-channel

MICROPHONE MIXER

The Model 250 Mixer is specifically designed for motion picture sound recording and remote broadcast transmission. The mixer features dialogue equalization on each incoming channel, master gain control, built-in microphone talk-back system, and is engineered by and for sound engineers, with the finest quality components. Uncompromising performance is combined with the latest solid state technology and contemporary, functional design.

All silicon transistors are used in printed circuit construction.

Versatile input circuitry to accommodate low level microphones, high level microphones, low level or zero level line inputs. Thus various combinations of microphones and lines may be mixed. Input transformers are used on all channels for complete circuit isolation.

Complete portability. No batteries to buy. Self-contained, rechargeable batteries provide economical operation where A.C. power is not available.

"Talk-Back" microphone for communication with recorder operator or "Boom Man."

Tone oscillator for setting line level and master gains at mixer and recorder input. Also, useful for sync marking of scenes, etc.

Dialogue equalization available on all channels for reducing "boominess" of speech-recording, low frequency background rumble, etc.

Human engineered to provide maximum operator comfort and efficiency.

Safety power switch.



Lightweight portability

SPECIFICATIONS

Inputs: Three low impedance microphones (50/250/600-ohm XL connector) with high gain/low gain switch and one 50/250/600-ohm line input.

Microphone inputs may be switched to provide up to four line inputs.

Phone jack provision for HI-Z microphone input.

Microphone Input Gain: 95 db.

Microphone Input Noise: At least -120 dbm. equivalent input noise or better. Typically -125 dbm.

Line Input Level: -20 dbm to +15 dbm.

Output: 600/150-ohm balanced line at +4 dbm (0 V.U.) nominal into a standard XL connector. +15 dbm maximum output.

Output Noise: At least 60 db below +4 dbm output.

Frequency Response: 50 Hz to 15 KHz, ± 3 db.

Dialogue Equalization: Separate switch for each channel. Response: -10 db at 100 Hz with dialogue "in."

Distortion: Less than 1% total harmonic for +4 dbm output.

Tone Oscillator: Approx. 800 Hz test tone for line level setting.

Talk-Back: Built-in microphone with key switch.

Monitor: 4½" V.U. meter and two rear mounted phone jacks.

Power Requirements: 25-hour operation from internal rechargeable batteries. May be charged from auto/truck battery or from 115-volt 50/60 Hz line.

Size: 13½" high, 16" wide, 6½" deep (case closed).

Weight: 19 lbs.

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Model 230

SOLID STATE

Nagra-compatible

MICROPHONE MIXER

The Model 230 Mixer was specifically designed to conform to the input characteristics of the Nagra ¼" tape recorder, with special consideration given to their esthetic compatibility.

FEATURES

- All silicon transistors are used in printed circuit construction.
- Versatile input circuitry to accommodate low level microphones, high level microphones, low level or zero level line inputs. Thus various combinations of microphone/line inputs may be mixed.
- Input transformers used on all channels for complete circuit isolation.
- Complete portability. Powered by Nagra.
- Dialogue equalization available on all channels for reducing "boominess" of speech recording, low frequency background rumbles, etc.
- Human engineered to provide maximum operator comfort and efficiency.



Convenient rear access to inputs.

SPECIFICATIONS

Inputs: Three low impedance microphones (50/250/600-ohm XL connector) with high gain/low gain switch and one 50/250/600-ohm line input. Microphone inputs may be switched to provide up to four line inputs. Separate jack provision for Hi-Z microphone input.

Microphone Input Gain: 95 dbm.

Microphone Input Noise: At least -120 db equivalent input noise or better. Typically -125 dbm.

Line Input Level: -20 dbm to +15 dbm.

Output: Compatible with input requirements of the Nagra.

Dialogue Equalization: Separate switch for each channel. Response, -10 db at 100 Hz with dialogue "in."

Distortion: Less than 1% total harmonic for +4 dbm output.

Power Requirements: Derives power from the Nagra.

Size: 4½" high, 13½" wide, 10¼" deep.

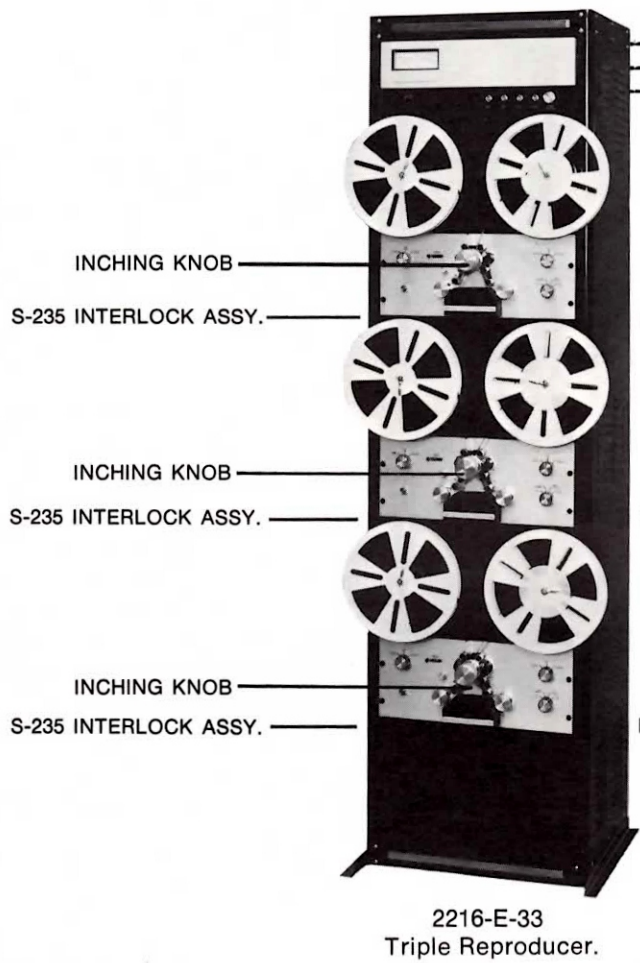
Weight: 7½ lbs.

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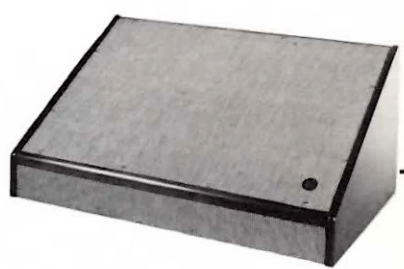
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M-437 INTERLOCK RELAY

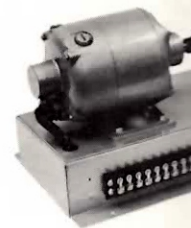
M-437 INTERLOCK RELAY

M-437 INTERLOCK RELAY

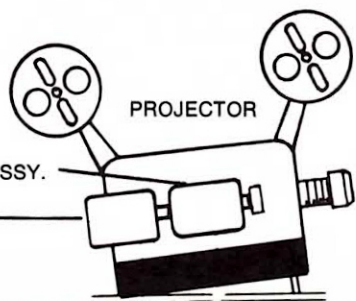
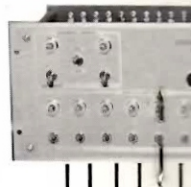


MONITOR SPEAKER

m370
M-801 SYSTEM DISTRIBUTOR

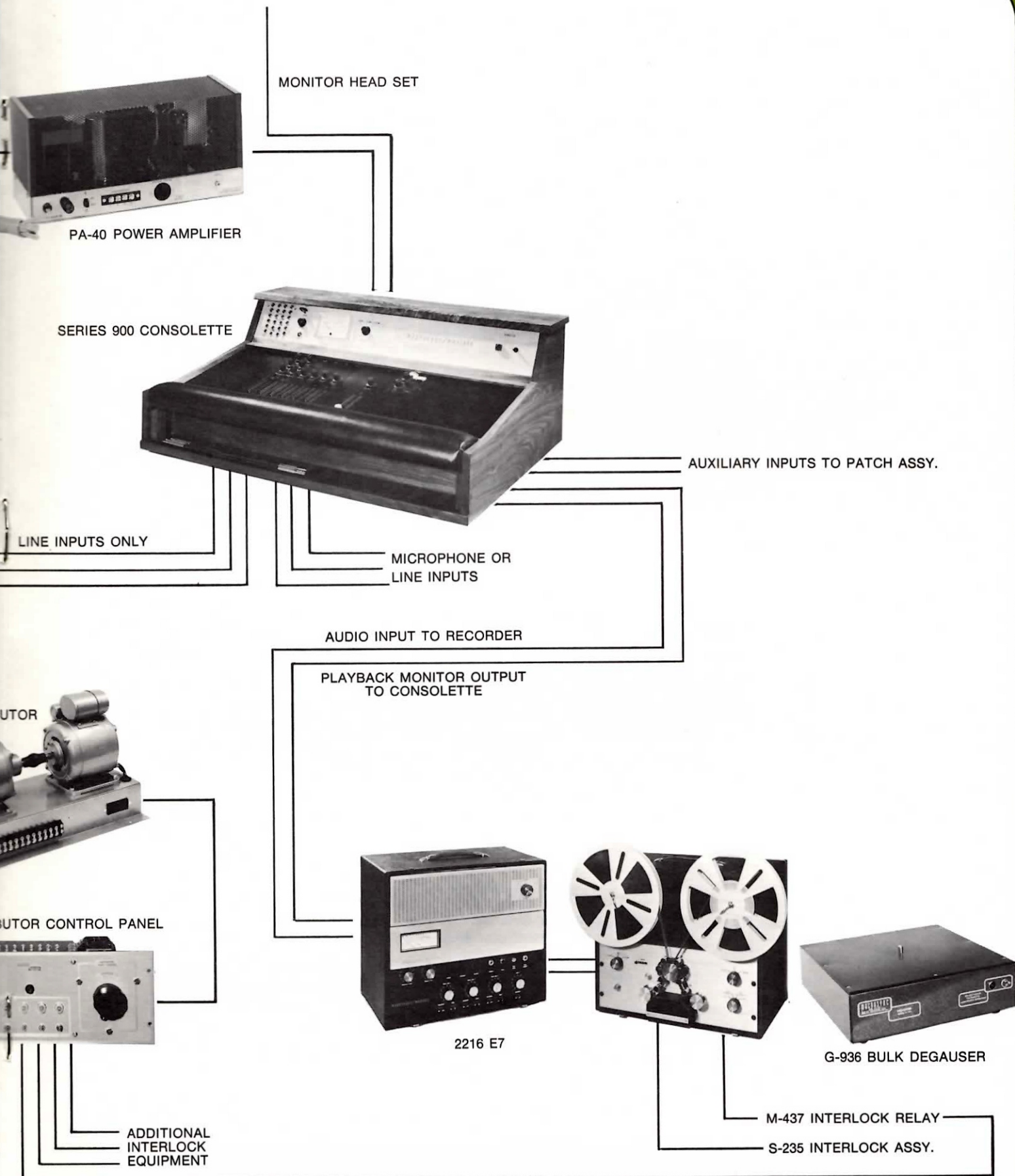


CP-350
M-790 DISTRIBUTOR

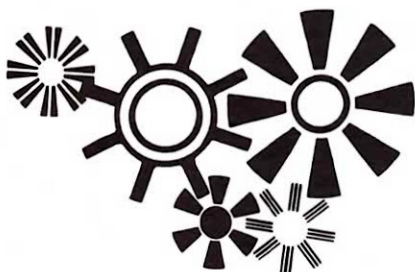


M-434 PROJECTOR INTERLOCK ASSY.

M-437 INTERLOCK RELAY



ELECTRICAL INTERLOCK PLANNING GUIDE



THE DISTRIBUTOR TYPE INTERLOCK SYSTEM is the most positive . . . assuring absolute interlock between reproducers, projector and recorder. This system is universally accepted by both major studios and small producers as the most efficient, versatile and dependable.

There are three basic components which comprise this system: the interlock motor for the individual equipments, the interlock distributor, and the interlock distributor control panel. In order to better understand the function of each component there should first be a common definition of terms with respect to the electrical interlock. The interlock motors that are mounted on individual pieces of equipment in the system, such as reproducers (dubbers), recorders and projectors, are also known as "selsyn," "slaves" and "repeaters." The interlock motor distributor is frequently referred to as a "selsyn transmitter" motor distributor or simply as the "master." The distributor control panel serves as a means for (A) selective switching of individual interlock motors in the system, (B) slow starts and stops, (C) reversing the entire interlock system.

A basic feature of the distributor control panel is that it may be remoted from the machine room, such as in a mixing console, etc. The interlock motor distributor controls the individual interlock motors in the system from a "dead stop" to "full run" in either direction at command from the distributor control panel.

With a distributor interlock system the interlock motors act as drive motors. While operating as a distributor interlock system the synchronous motors on the individual pieces of the equipment are not used. Since all Magnasync recording and reproducing mechanisms are furnished with direct drive synchronous motors, any single unit in the system may be operated individually by its own synchronous drive motor without running the distributor system.

In conjunction with stock interlock accessories, Magnasync designs and manufactures electrical interlock systems to meet any special requirements. Your inquiry will receive prompt attention.

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GUIDE FOR A STUDIO INTERLOCK SYSTEM

REQUIREMENTS:

- A. Three (3) reproducers (dubbers) for composite mixing of music, narration and sound effects.
- B. Recording facilities suitable for studio and location.
- C. Interlocked projection for double system screenings, post-sync narrative recording, post-sync effects recording and musical scoring.
- D. Audio mixing for both recording and dubbing.

EQUIPMENT LIST:

QUANTITY	DESCRIPTION
1	2216-E-7 16mm Recorder for studio and location recording.
1	S-235 Interlock Motor Kit.
1	M-437 Interlock Motor Relay for S-235 Interlock Motor.
1	M-790 Distributor Control Panel.
1	M-801 Interlock Motor Distributor.
1	2216-E-33 Triple Reproducer.
1	M-434 Projector Interlock (select model according to your projector requirements).
1	M-437 Interlock Motor Relay for M-434 Projector Interlock.
As Required	C-46 Interlock Cable (50'); set for interlock connection.

This listing of equipment includes a triple reproducer, a recorder, an interlock distributor and an interlock distributor control panel. The control panel permits remote operation of all equipment; equipment may be located at any convenient place in the studio.

The next step to complete your studio facilities is the selection of audio equipment. One suggested plan incorporates the following:

QUANTITY	DESCRIPTION
1	G-962 Console with one of three Microphone Pre-Amplifiers, depending upon your requirements.
1	PA-40 Power Amplifier.
1	Monitor Speaker. (E.V. Sentry)

To interconnect the audio system the following cables would be required:

QUANTITY	DESCRIPTION
4	Audio Cables; three for connecting output of 2216-E-33 Triple Reproducer to G-962 Console inputs and one for connecting 2216-E-7 Recorder monitor output to G-962 Console "film-direct" facilities.
1	Audio Cable for connecting G-962 Console output to 2216-E-7 Recorder input.

Additional audio cables such as microphone cables interconnecting audio cable to power amplifier and auxiliary audio inputs can be supplied according to your requirements.

The system is now complete . . . both interlock and audio . . . for 16mm re-recording.

17.5mm and 35mm Electrical Interlock Systems are available and need only the substitution of appropriate recorder, reproducers and associated interlock accessories.

INTERLOCK ACCESSORIES:

for 115 volts, 60/50 cycles, single-phase, 1800 RPM at 60 Hz, 1500 RPM at 50 Hz.

For direct coupling to Magnasync Recorders, Reproducers or other equipment.

Distributor	Control Panel	Accessories	Relay (one req'd for each accessory)
M370 M-801	CP-350 M-790 M-791	S-235 M-480A M-431 M-432 M-434B M-434BS M-434G M-434D M-434J M-434P M-439	M-437
M371 M-801X	CP-350 M-790 M-791		

C-46 cable required for interlock.

INTERLOCK ACCESSORIES:

for 220 Volts, 60/50 cycles, three-phase, 1200 RPM at 60 Hz, 1000 RPM at 50 Hz.

A three-phase interlock system can be coupled to any standard shaft speed by Gilmer timing belts and pulleys.

Distributor	Control Panel	Accessories (*)	Relay (one req'd for each accessory)
M-803	M-793	M-473 M-430	M-437X

(*) The M-430 Interlock Motor can be adapted to most interlock requirements. Send complete specifications for our quotations.

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SYNC-SELSYN ELECTRICAL INTERLOCK SYSTEM

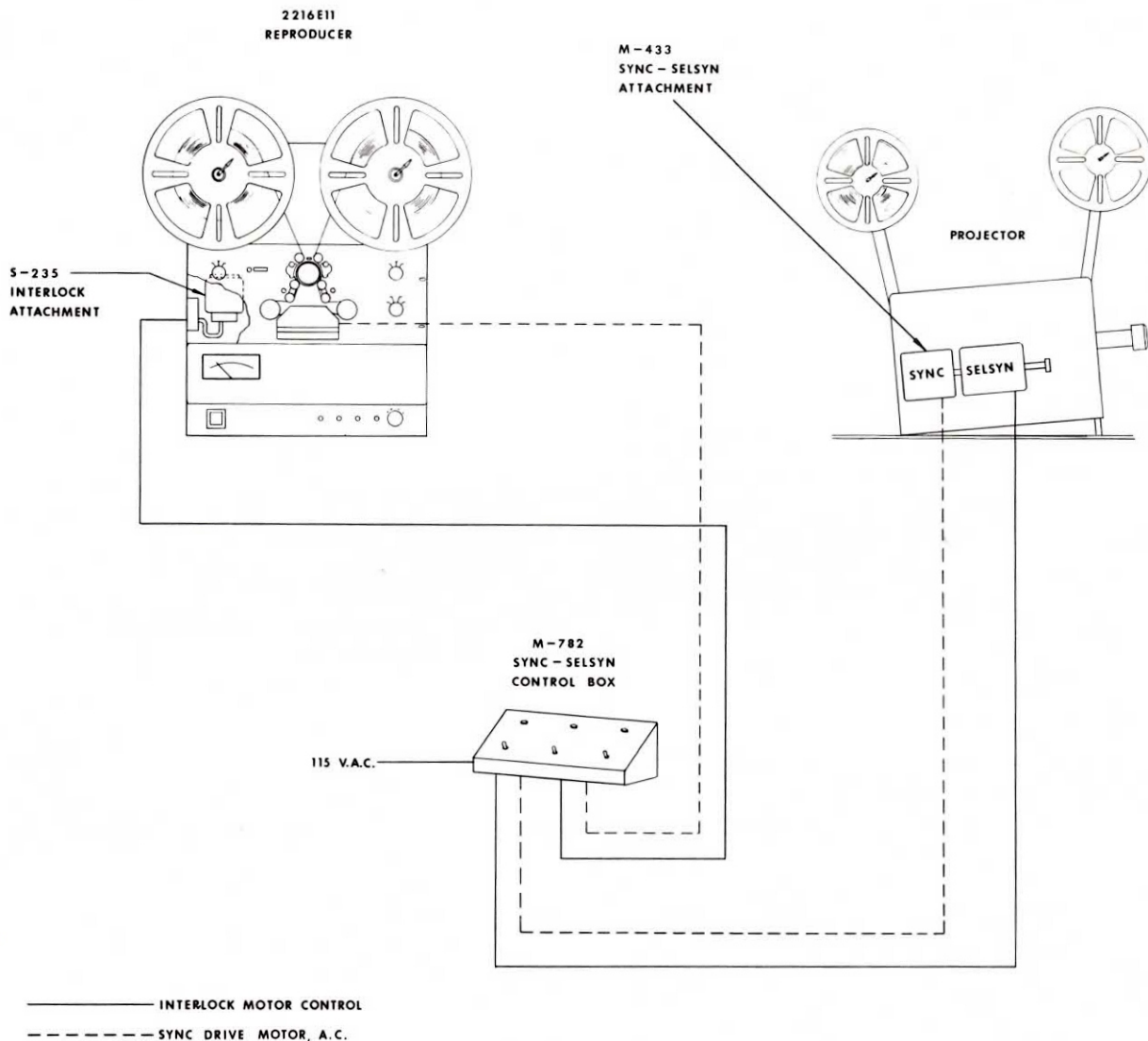
The block diagram is representative of a 2-unit Sync-Selsyn Electrical Interlock System. The system operates on the metering principle by the use of interlock motors on individual pieces of equipment electrically locked together with the sync drive motors providing the drive power source. In a system such as this, the interlock motors must be in proper rotation and be mechanically attached to the sync drive motors.

Interlock motors must be locked together electrically by using a Sync-Selsyn Control Box. Simultaneous starting of all the system's sync drive motors is effected with the master switch.

Sync-Selsyn Control Box Model M-782 is for two units; Model M-784 is for up to four units.

See page 22 for Projector Interlock Components,

TYPICAL SYNC-SELSYN ELECTRICAL INTERLOCK SYSTEM



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■ INTERLOCK

Listed below are some examples of Projector interlock Kits. Other Projector Kits available on request. When possible, projector should be sent to Magna-sync/ Moviola for these modifications.

M-430

INTERLOCK MOTOR, heavy duty 220-volt, three-phase excitation with 220-volt, 3-phase secondary. Compatible with Westrex and RCA interlock system. 1000/1200 RPM.

M-431

INTERLOCK MOTOR, heavy duty, 110-volt single-phase excitation with 110-volt, 3-phase secondary. Quotations on 35mm interlock attachments furnished on request. 1500/1800 RPM.



M-432

INTERLOCK MOTOR, standard duty, 110-volt, single-phase primary 110-volt, three-phase secondary. 1500/1800 RPM.



SYNC SELSYN ATTACHMENT for 16mm projectors.

M-433B

SYNC INTERLOCK, for Bell & Howell Standard projector.



M-433BS

SYNC INTERLOCK, for Bell & Howell Specialist 542 and AV 535 projectors. Must be installed at factory.

M-434B

INTERLOCK MOTOR for Bell & Howell Standard projector.

SELSYN INTERLOCK ATTACHMENTS FOR USE WITH DISTRIBUTOR SYSTEMS.

M-434BS

INTERLOCK MOTOR, for Bell & Howell Specialist 542 and AV 535 projectors. (Factory installation)

M-434D

INTERLOCK MOTOR, for De Vry projector.

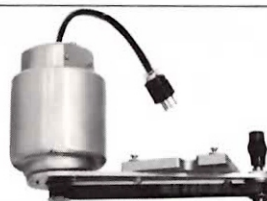
M-434G

INTERLOCK MOTOR, for Graflex Galaxy projector.



M-434J

INTERLOCK MOTOR, for Jan projector.



M-434P

INTERLOCK MOTOR, for Kodak Pageant projector.



M-437

INTERLOCK MOTOR RELAY ASSEMBLY, one required for each single-phase interlock motor when used with distributor system.



M-437X

INTERLOCK MOTOR RELAY ASSEMBLY, one required for each three phase interlock motor when used with distributor system.

M-439

REMOTE FOOTAGE COUNTER, in metal enclosure. Specify whether 16mm or 35mm speed. 50/60 Hz Selsyn driven. Includes relay.

M-480A

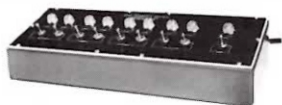
INTERLOCK MOTOR ATTACHMENT, for X-400 Type 15 Recorder. Complete with M-432 Selsyn Motor.



■ INTERLOCK

M-782

SYNC-SELSYN CONTROL BOX, for use with any model Recorder/Reproducer equipped with a Selsyn and a projector equipped with sync-interlock attachment M-433. Has receptacles for two Selsyn cables and a Selsyn lock switch. Two receptacles for sync motor control and a switch which energizes both drive motors simultaneously. Complete with two 25 foot Selsyn cables and two 25 foot AC cords.



M-784

SYNC SELYSN CONTROL BOX. Same as M-782 but with four receptacles for sync and Selsyn motors. Suitable for interlocking two, three, or four pieces of equipment equipped with both Selsyn and sync motors. Selsyn equipped X-400 Series dubbers must have special wiring provided to operate with this system. Operates in reverse if each individual synchronous motor is equipped with a reverse switch. Interconnecting cables supplied.

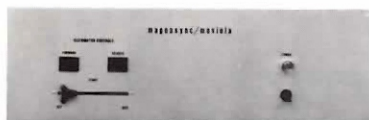


CP-350

DISTRIBUTOR CONTROL PANEL. 110-volt, 50-60 cycle. Panel is 5 1/4" x 19" for rack mounting. Features illuminated push button switches and slide pot control for slow start. Used with M-370 and M-371.

CP-351

DISTRIBUTOR CONTROL PANEL. Same as CP-350 except for use with 22-volt, 50-60 cycle, single phase.



RC-340

REMOTE CONTROL PANEL. Enables operator to run distributor system from any auxiliary remote position. Use with M-370 and M-371 Distributors and G-962. Panel size is 5 7/8" x 19".

RC-341

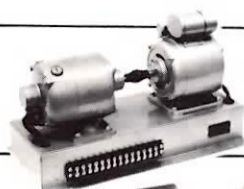
REMOTE CONTROL PANEL. Same as RC-340 except for use with 220-volt, 50-60 cycle, single phase.

RC-360

REMOTE CONTROL PANEL. Same as RC-340 except panel size is 3 1/2" x 6".

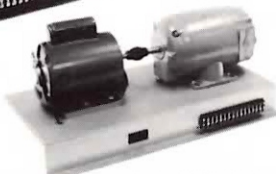
RC-361

REMOTE CONTROL PANEL. Same as RC-341 except panel size is 3 1/2" x 6".



M-370

DISTRIBUTOR. Heavy duty interlock with 110-volt single phase, 50/60 Hz drive and excitation for system employing M-431 or M-432 Interlock Motors. Rated to operate up to six standard recorders, dubbers or projectors. 1500/1800 RPM.

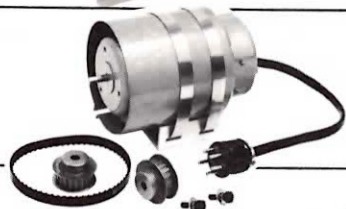


M-371

HEAVY DUTY DISTRIBUTOR using 1/2 H.P. Drive Motor, capable of operating eight units. 1500/1800 RPM. Especially useful when operating 35mm Projectors.

M-372

HEAVY DUTY DISTRIBUTOR. Same as M-371 except for 220-volt, 50-60 cycles, single phase.



S-235

INTERLOCK MOTOR ATTACHMENT for 2200 Series Recorders and Reproducers. Includes motor, bracket, belt, pulleys and hardware for mounting.



SP-60S

SOLID STATE SYNC PULSE AMPLIFIER Designed especially for energizing the synchronous drive motor of sprocketed film recorders. The circuitry features a voltage meter and facility for remote indication of loss of Sync Signal. The circuitry also features a gain control for manual adjustment of the drive motor voltage. Power consumption: 100 watts. Size: 5 1/2" high, 19" wide, 7" deep. Weight: 17 lbs.

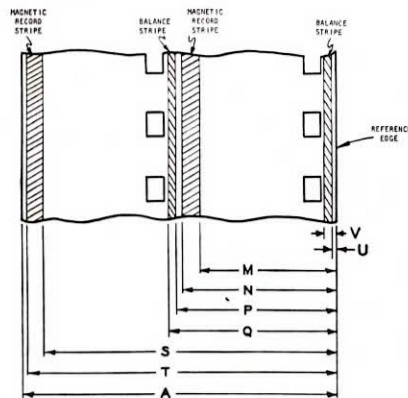
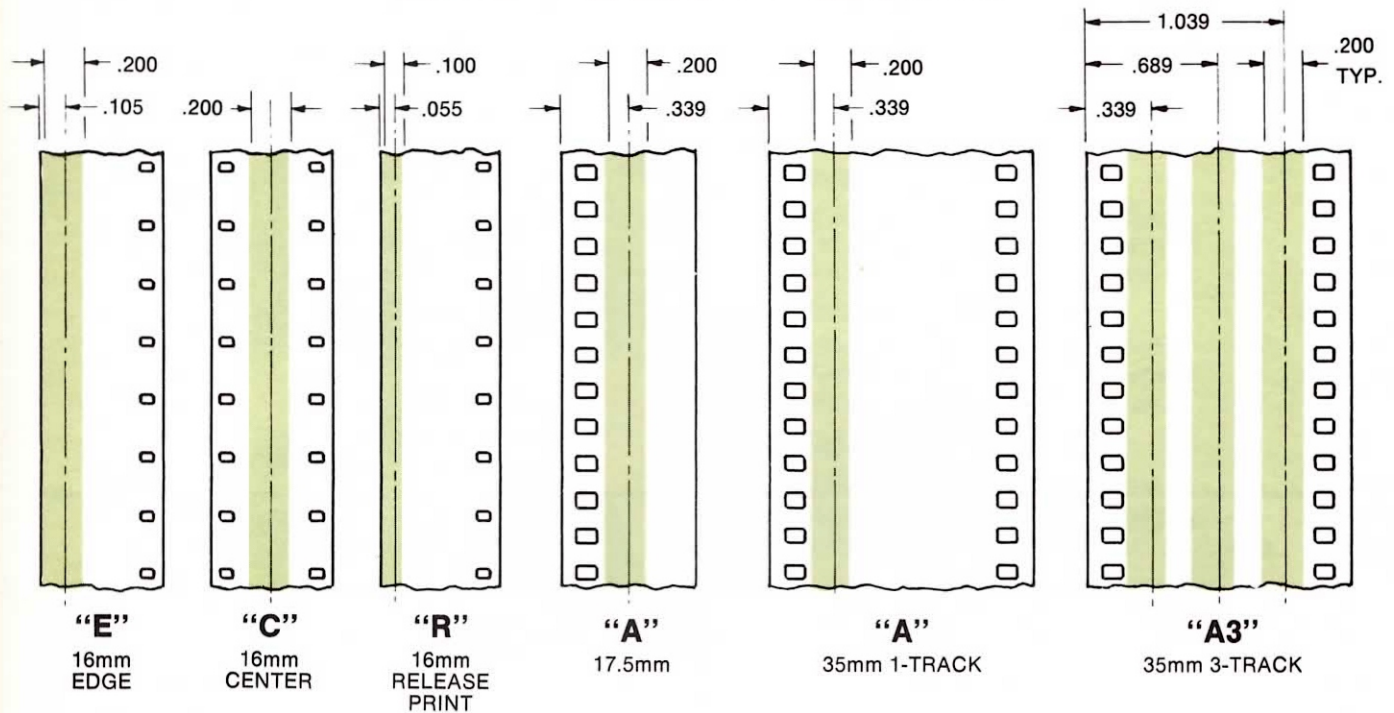
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TRACKING

Quotations will be submitted for special tracking

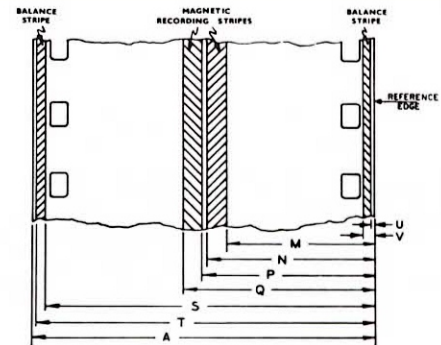


DRAFT USA STANDARD DIMENSIONS OF
Magnetic Striping of 16mm Motion-Picture Film Perforated Super 8, 2R-1667 (1-3)

1. Scope

This standard specifies the location and dimensions of recording stripes and balance stripes applied to 16mm motion-picture film with two rows of super 8 perforations in positions 1 and 3.

Dimensions	Inches	Millimeters
A	0.623 nom	15.95 nom
M	0.285 ± 0.002	7.24 ± 0.05
N	0.312 ± 0.002	7.92 ± 0.05
P	0.317 ± 0.003	8.05 ± 0.08
Q	0.329 ± 0.003	8.36 ± 0.08
S	0.599 ± 0.002	15.21 ± 0.05
T	0.626 ± 0.002	15.90 ± 0.05
U	0.003 ± 0.003	0.08 ± 0.08
V	0.015 ± 0.003	0.38 ± 0.08



DRAFT USA STANDARD DIMENSIONS OF
Magnetic Striping of 16mm Motion-Picture Film Perforated Super 8, 2R-1667 (1-4)

1. Scope

This standard specifies the location and dimensions of the magnetic recording stripe and the balance stripes applied to 16mm motion-picture film with two rows of super 8 perforations in positions 1 and 4.

Dimensions	Inches	Millimeters
A	0.628 nom	15.95 nom
M	0.285 ± 0.002	7.24 ± 0.05
N	0.312 ± 0.002	7.92 ± 0.05
P*	0.316 ± 0.002	8.02 ± 0.05
Q	0.343 ± 0.002	8.71 ± 0.05
S	0.613 ± 0.003	15.57 ± 0.08
T	0.625 ± 0.003	15.85 ± 0.08
U	0.003 ± 0.003	0.08 ± 0.08
V	0.015 ± 0.003	0.38 ± 0.08

*The millimeter conversion is approximate so that Dimension minimum equals Dimension N maximum.

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MAGNETIC RECORD AND PLAYBACK HEADS



"A"
35mm 1-TRACK



"E"
16mm
EDGE



"C"
16mm
CENTER

16mm SINGLE-CHANNEL HEADS FOR X-400 AND 602 RECORDERS/REPRODUCERS

Model H-2ER, Edge Track Record
Model H-2CR, Center Track Record
Model H-1R, Release Print Record

Model H-2EP, Edge Track Play
Model H-2CP, Center Track Play
Model H-1P, Release Print Play

Model H-2EX, Edge Track Erase
Model H-2CX, Center Track Erase
Model H-1X, Release Print Erase

17.5mm SINGLE-CHANNEL HEADS FOR 702 SERIES RECORDERS/REPRODUCERS:

17.5mm heads are designed to Track
Channel No. 1 on 17.5mm magnetic
film as outlined in the USA Standards.

Model H-2R7, Record
Model H-2P7, Play
Model H-2X7, Erase

35mm SINGLE-CHANNEL HEADS FOR 135 SERIES RECORDER/REPRODUCERS:

35mm heads are designed for either
Channel No. 1 or Channels No. 1,
2 and 3 in conformance to USA
Standards.

Model H-A1R, Record
Model H-A1P, Play
Model H-A1X, Erase

35mm THREE-CHANNEL HEADS FOR 135 SERIES RECORDER/REPRODUCERS:

Model H-A3R, Record
Model H-A3P, Play
Model H-A3X, Erase

PLUG-IN HEAD MODIFICATIONS: (INCLUDES RECORD AND PLAY HEADS)

X-400 Series Recorders:

Model X-45-H-E, Edge Track
Model X-45-H-C, Center Track
Model X-45-H-R, Release Print

602 Series Recorders:

Model X-46-H-E, Edge Track
Model X-46-H-C, Center Track
Model X-46-H-R, Release Print

702 Series Recorders:

Model X-47-H

135 Series Recorders:

Model X-41-H

2100 Series Recorders/Reproducers

Model numbers same as listed
above with the addition of
SS to signify use with solid
state amplifiers. Example:
H-2EP SS indicates 200 mil,
edge track, playback head.

Head Mounting Hardware

HMK 16 602-702 Series
HMK 35 135 Series

*When ordering replacement heads please send
Model and Serial Number of equipment on
which heads are to be installed.*

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★ **HEAD ASSEMBLIES FOR SERIES 2200
RECORDERS/REPRODUCERS**



16MM, 200 MIL EDGE TRACK

- 2-103556 Head Assembly, Record
- 2-103557 Head Assembly, Playback
- 2-103558 Head Assembly, Erase

16MM, 200 MIL CENTER TRACK

- 2-103584 Head Assembly, Record
- 2-103585 Head Assembly, Playback
- 2-103586 Head Assembly, Erase

16MM 100 MIL, RELEASE PRINT

- 2-103590 Head Assembly, Record
- 2-103591 Head Assembly, Playback
- 2-103592 Head Assembly, Erase

17.5MM AND 35MM, 200 MIL, 1 TRACK

- 2-103563 Head Assembly, Record
- 2-103564 Head Assembly, Playback
- 2-103565 Head Assembly, Erase

35MM, 200 MIL, 3 TRACK

- 2-103578 Head Assembly, Record
- 2-103579 Head Assembly, Playback
- 2-103580 Head Assembly, Erase

★ When adding Erase Head to 2200 Series,
use kit numbers listed below:

16MM, EDGE TRACK

KIT NO. HXK-1

- 1 ea. 2-103558 Head
- 1 ea. 2-103245 Cable
- Mounting Hardware

16MM, CENTER TRACK

KIT NO. HXK-2

- 1 ea. 2-103586 Head
- 1 ea. 2-103245 Cable
- Mounting Hardware

16MM, RELEASE PRINT

KIT NO. HXK-3

- 1 ea. 2-103592 Head
- 1 ea. 2-103245 Cable
- Mounting Hardware

17.5MM AND 35MM, 1 TRACK

KIT NO. HXK-4

- 1 ea. 2-103565 Head
- 1 ea. 2-103245 Cable
- Mounting Hardware

35MM, 3 TRACK

KIT NO. HXK-5

- 1 ea. 2-103580 Head
- 3 ea. 2-103245 Cable
- Mounting Hardware

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AUDIO ACCESSORIES

Items listed may be used to update models 602-702-135 to latest solid state configuration.



MODEL 2241 RECORD/REPRODUCE AMPLIFIER

Record/Reproduce Amplifier mounted on 7" x 19" panel. Amplifier has latest solid state circuitry. Plug-in printed circuit modules.



MODEL 2244 BASIC REPRODUCE AMPLIFIER

Basic Reproduce Amplifier mounted on 7" x 19" panel. Modular "building block" design provides for expansion of a system from one channel to four by means of plug-in modules.

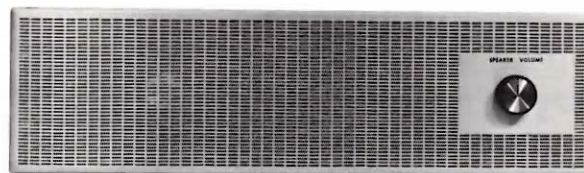
- 2244-1 Basic Reproduce for one channel
- 2244-2 Basic Reproduce for two channels
- 2244-3 Basic Reproduce for three channels
- 2244-4 Basic Reproduce for four channels



PS22 OSC22 RE22 LA22 PB22

Plug-in printed circuit modules for Model 2241 Record/Reproduce Amplifiers and Model 2244 Reproduce Amplifier. Equalization available for SMPTE, MPRC and CCIR. When ordering state equalization required. When adding reproduce channels to the basic 2244-1, one LA22, PB22, and one Output Transformer is required per channel.

"A"	16mm	SMPTE
"B"	17.5 — 35mm	MPRC
"C"	16mm	CCIR



MODEL 2251 MONITOR AMPLIFIER & SPEAKER

Solid State Monitor Amplifier and Speaker used with Model 2241 Record/Reproduce Amplifier and Model 2244-1 Reproduce Amplifier. Output impedance 4-8 ohms.

MODEL 240 MIXING PANEL

INPUTS: Three low impedance microphones. (50/250/600-ohm XL connector) with high gain/low gain switch and one 50/250/600-ohm line input. Microphone inputs may be switched to provide up to four line inputs. Phone jack provision for Hi-Z microphone input.

MICROPHONE INPUT GAIN: 95 db.

MICROPHONE INPUT NOISE: At least — 120 db equivalent input noise or better. Typical —125 dbm.

LINE INPUT LEVEL: —20 db to +15 db.

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ACCESSORIES

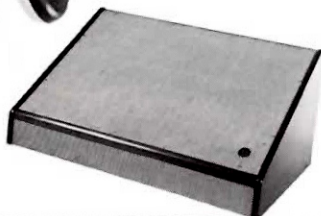
for Magnasync synchronous magnetic film sound recorders,
reproducers and related equipment.

AUDIO



B-37

HEAD SET, professional quality 600-ohm dynamic. Complete with large padded ear cushions affording efficient seal against outside noises.



EV SENTRY I

STUDIO MONITOR, for wall or ceiling mounting. Frequency response, 30 to 20,000 Hz. EIA sensitivity, 49 db. Impedance, 16, 150, 600 ohms. 20-watt. 17" x 37" x 21 3/4", 82 lbs.



EV SENTRY II

STUDIO MONITOR, floor model. Same electrical specifications as EV SENTRY I. 32" x 20" x 13", 68 lbs.



PA-40

POWER AMPLIFIER, 40 watt high quality low distortion monitoring amplifier. Can be installed in G-963 Console. Power switch and volume control mounted on 1 3/4" x 19" rack panel.

PA40R

POWER AMPLIFIER, with power switch and volume control mounted on 7" x 19" rack panel.

Purchase the following Test Films direct from:
THE SOCIETY OF MOTION PICTURE AND TELEVISION
ENGINEERS
9 East 41st Street
New York, New York 10017

16mm Edge Track Azimuth, 100 ft., M16AL
16mm Edge Track Multi-frequency, 200 ft., M16MF
35mm 3-Track Azimuth, 50 ft., 3TH-8
35mm 3-Track Multi-frequency, 320 ft., RCFM

MAGNASYNC TEST FILMS

F-2

TEST FILM, Center track azimuth 100-foot roll. 16mm

F-4

TEST FILM, Center track multi-frequency, 200-foot roll. Magnasync equalization. 16mm

F-4X

TEST FILM, 16mm center track test film multi-frequency, 200-foot roll. SMPTE Equalization.

F-5

TEST FILM, 17.5mm azimuth, 100-foot roll, 90 fpm.

F-6

TEST FILM, 17.5mm multi-frequency, 300-foot roll, 90 fpm.

INTERCONNECTING CABLES

(All Audio Cables are shielded)

C-45

CABLE, Microphone (25 ft.)

C-45X

CABLE, Microphone (50 ft.)

C-46

CABLE, Interlock Motor less connectors. (50 ft.)

Special interconnecting Cables available upon request.



REELS

M-76A

SPLIT REEL, 400-foot, 16mm, Dural.

M-77B

SPLIT REEL, 1200-foot, 16mm and 17.5mm, Dural. Includes M-78 Hub.

M-35B

SPLIT REEL, 1200-foot, 35mm, Dural. Includes M-79 Hub.

M-78

LARGE ALUMINUM HUB, for 16mm split film reels. Presses on plastic core.

M-79

LARGE ALUMINUM HUB, for 35mm split film reels. Presses on plastic core.

RACK CABINETS

R-77

Rack Cabinet, deluxe enclosed 19"x77" panel space.

R-61

Rack Cabinet, deluxe enclosed 19"x61 1/4" panel space.

R-42

Rack Cabinet, deluxe enclosed 19"x42" panel space.

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SERIES 800

PROGRAM EQUALIZERS

Specifically designed for magnetic recording and reproduction.

No maintenance required . . . all components except switches are sealed and encapsulated. Guaranteed performance.



MODEL G-801



MODEL G-803

SPECIFICATIONS

Impedance: 600 ohms.

Switching: Silent "IN-OUT" with 14 db loss pad.

Insertion Loss: 14 db.

Input Level: -70 dbm min. +20 dbm max.

Controls: Low frequency, 8 positions in 2 db steps.

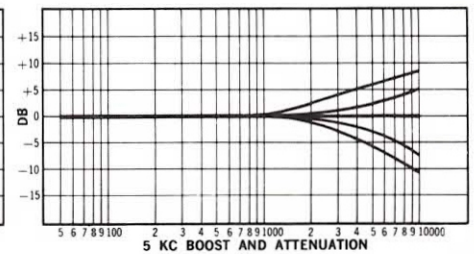
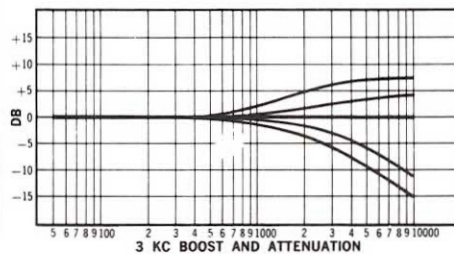
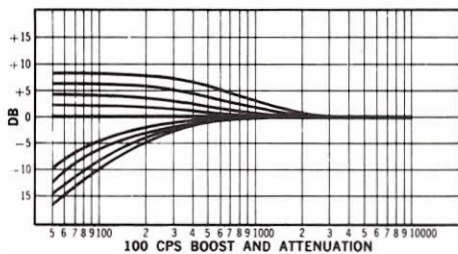
High frequency, 8 positions in 3 db steps.

Mounting: Standard rack panel.

Size: 19" x 3 1/2" x 3 1/2"

Model: G-801, Single Equalizer

Model G-803, In-line (triple) Equalizer



SERIES 900 DEGAUSSERS

For total erasure of all magnetic films, audio and instrumentation tapes.



**MODEL A-937,
SEMI-AUTOMATIC**



**MODEL G-936,
MANUAL**

The film or tape is placed on the turntable, a button is depressed starting the table which revolves for 12 seconds, then automatically stops, leaving the degaussing field on for an additional 5 seconds. This allows the operator to remove the film from the field. Film revolves smoothly, which eliminates any noise patterns that could be left with other types of degaussers. All sizes of audio tape, instrumentation tape or magnetic film may be used. Housed in an attractive aluminum housing with operating instructions printed adjacent to START button.

This economically priced model is housed in a square metal enclosure with a phenolic top. Centering post locates hub of film. In operation, film is placed with hub over centering pin and the field energized with the POWER-ON switch. Film is slowly revolved two or three times and then gradually removed from degaussing field before power is switched off.

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MOVIOLA'S NEW CONSOLE EDITOR



ABOVE PRICED @ \$7,750.00

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MOVIOLA'S NEW CONSOLE EDITOR



The Moviola "Anniversary Series" horizontal console editing table has been designed to meet the demands of all facets of editing within the motion picture and television industries. For the past two years the Company has conducted a worldwide survey study to determine the most desirable equipment features as related to contemporary editing techniques and future possibilities.

Most significant in this search for new ideas in equipment design are utilization of the overall engineering technology existing within the Magnasync/Moviola manufacturing divisions. This engineering and development staff has integrated many features from tape transport, computer and logic systems into the editing console. These features, added to the new Moviola "SyncroPrism" projection system, provide the industry with an entirely new concept of editing capability and convenience.

Considering the requirements of motion picture, television, education, industry and documentation, the Moviola Console has been designed not only as an editing device, but as a "preview theatre." The picture and sound quality have been far advanced over contemporary equipment, whereupon the operator can more precisely compose, edit and mix the program material. Since the unit is equipped with two sound heads and a composite optical/magnetic picture head, dialogue, music and effects can be cut to the picture with sound mixing and listening quality comparable to the final composite. Slide attenuators are used for each sound track plus a master gain control and high/low equalization controls.

MODULAR COMPOSITE DESIGN

The modular composite design concept has been followed throughout the editing console system. This includes the interchange of 16mm and 35mm sound heads. The plug-in capability compensates for the transposition of torque requirements and speed differences between 16/35mm. No other changes are necessary due to the "modular" design of the sound head transport.

ENGINEERED RELIABILITY

The engineering practice followed to achieve the modular design of both mechanical and electronic components has been further extended to include "engineered reliability." All functional factors were studied including component redundancy. Interchangeable modules comprise the electronic system and utilize the "mother-board" principal for circuit function distribution. A readily accessible card cage houses the plug-in circuit boards which control the modular transports and readout system.

With motion picture production activities remotely extended, maintenance becomes a prominent consideration. Equipment "down time" can ruin a production schedule or forfeit an artistic achievement. Moviola has also included a comprehensive instruction and graphic illustrated maintenance manual. A step-by-step digest of cause and remedy data has been prepared in both layman and engineering terms. Both electronic and mechanical interchangeable modules are available through Moviola world-wide distribution centers.

FILM TORQUE TRAVERSE SYSTEM

Torque motor assemblies as used in computers and industrial tape transports are incorporated into the editing console. Each of the two sound heads and the picture head have independent torque turntable film handling assemblies. Selectively, the operator can traverse the film fast-forward or fast-reverse or the "master control" will rapidly forward or rewind the picture and two sound tracks simultaneously.

In any mode the film feed-in and feed-out tensions are precisely maintained, eliminating excessive sprocket hole pull and film spillage. The rapid film traverse reaches ten times sound speed without film spillage or damage. Push button and rotary controls are used with the same "solid state" logic as is found in sophisticated tape duplicating systems. When the stop button is pushed, the respective film turntable assemblies precisely stop with no spillage or loss in tension.

MOVIOLA "MICRO INCHING" SPROCKET DRIVE

The drive sprockets of the picture head and two sound heads are electrically controlled for "inching" or for single frame viewing and locating picture and sound start marks.

PICTURE/SOUND "INTERLOCK" AT TEN TIMES SOUND SPEED

The servo-tach interlock drive system is operated from a single master control. The film can be moved from one or two frames per second up to ten times "sound speed" through the sprocket gate assemblies.

The movement of the control provides acceleration from "standstill" to sound speed and from sound speed, fast forward. With movement of the control to the left, the film is driven in reverse.

With "micro-variable" control over the speed, the film can be stopped precisely at the end of a scene for ease in marking. Correspondingly, the rapid film traverse provides ease in scene selection.

When using the servo-tach drive either or both sound head transports can be programmed for decoupling from the "locked mode" and the film rapidly moved forward or reverse. For example, soundtrack No. 2 may be rapidly re-wound while the picture and sound track No. 1 remain locked together and traversing at sound speed. Alternately the programming can be transposed to the "master" control for all units to "rewind" or "fast forward."

The new servo-tach motor system maintains a constant torque ratio on the drive sprockets regardless of the speed. This breakthrough in film handling eliminates film spillage, buckling and damage. This feature, coupled with the constant tensions from the torque turntables, makes the console editor a "unified" transport assembly.

MOVIOLA ELECTROMATIC DIFFERENTIAL SYSTEM

To speed the editing process and convenience, Moviola has developed a new system of film advance and retard. The system is completely electrically operated and controlled to provide selective advance or retard of both sound head transports. While the picture is in motion at sound speed, through the servo drive either of the sound heads can be advanced or retarded at a rate of four frames per second. For example, if the dialogue is out of sync to the

picture, the operator can push either the advance or retard button to adjust for precise unity. For added convenience, the picture aperture and the sound heads are in parallel placement for precise "sync" or "marking."

The advance/retard capability also enables the editor to sync music and effects, such as a door slam, or have the music starting and/or ending on a precise "beat." With only two control buttons for the picture-sound interlock start/stop time loss has thereby been minimized.

MOVIOLA CHRONA-TACH FRAME/FOOTAGE-SECOND/MINUTES DISPLAY SYSTEM

The Moviola chrona-tach system computes and displays frames and footage or minutes and seconds. The electronic tachometer output is coupled to the servo motor drive. Therefore, the tabulation begins from a single frame per second and will compute up to ten times sound speed. In other words, this would approximate 240 frames per second. Transversely, the counter can be programmed to display seconds and minutes.

Considering film as a medium for television and the cost per second of prime time, the chrona-tach feature automatically displays its importance. Additionally, this computer readout enables the operator to post his log sheet for all facets of the editing process as well as support data for the final printing process. Details of each editing function can be maintained, whereas the exact frame and footage or exact seconds and minutes may be programmed for readout either in the forward or reverse mode.

FULL VISION THREADING

Each transport has been designed with two drive sprockets suitably spaced to provide full vision threading. Both picture and sound tracks may be "inched" forward or reverse for precise adjustment of their respective "sync-marks."

CALIBRATED LOOP SETTING

A breakthrough in threading has been accomplished since the picture and sound head threading is identical. After threading the left hand sprocket, the film is pulled upward over the right hand sprocket calibrating diameter to maximum tension — i.e., lowering the film slightly with release of tension positions the film on the appropriate sprocket teeth for op-

timum tension. Constant maximum picture stability and MAG head contact provides "preview theatre" quality.

ADVANCE/RETARD READOUT DISPLAY

The selective advance and retard of both sound heads is tabulated in the digital display window. A separate selector switch is used for each sound head and is operatable when the picture is traversing at sound speed.

Either the "advance" or "retard" displaces the film four frames per second at sound speed. Two additional windows display the + or - command, and the film advance or retard count will read out up to 99 frames. The frame count and + or - "readout" will remain displayed until the sound head is removed from "lock" with the picture.

MOVIOLA "IC" AUDIO SYSTEM

A unique combination of integrated circuit chips comprise the new console audio system. SMPTE or CCIR standards are maintained for frequency response and output level for two standard 16mm sound heads, plus one single system MAG head and one optical sound head.

There are four preamplifiers (one for each head) which are mixed with "slide attenuators" to a master gain control and monitor amplifier. A high/low frequency equalizer has a "normal" setting of flat response with boost and attenuation of both high and low frequencies.

The integrated circuits used have the critical circuitry self-contained in the miniature "chip." The overall circuit reliability factor is enhanced due to the fewer number of external components involved. Additionally, the cost for replacing the integrated chips is far less than conventional "discreet component" plug-in type circuit boards. The console editor audio system design is truly equal to the present state-of-the-art.

MOBILITY AND PORTABILITY

Considering today's fast moving pace and the trend to location production, the console editor incorporates "mobility" and "fold-up" features never before found in this type of equipment.

The two upright console pedestals are equipped with ball-type casters. A special hinge was designed which permits the console to be tipped in a vertical position, whereupon it can be moved through a 28 inch door open-

ing from room to room. Additionally, the two pedestals are hinged inward to the bottom of the console and lock into position for shipping purposes. For example, the fold-up feature allows the unit to be carried in the average station wagon. The screen box is detachable and can be carried separately, thereby reducing the overall primary bulk factor.

SINGLE FRAME VIEWING

Single frame viewing with full picture brightness is now possible with no heat damage to the film. A new condenser lens and mirror system eliminates the heat transmission from the projection lamp. This feature, coupled with the use of a "dichroic" mirror and tungsten-halogen lamp, provides unusual picture brightness.

FORWARD/REVERSE OPERATIONS THROUGH DRIVE SPROCKETS

The servo-tach motor system incorporates circuitry for regulating the acceleration rate at any setting on the controls. This feature eliminates "jumpy" starts and stops and coordinates the acceleration equal to the takeup or rewind turntables. "Looping" and "jerking" of the film from standstill, "sound speed" to ten times sound speed is eliminated.

The sprocket gate assembly and stripper arrangement maintains precise control of the film from zero to full acceleration. This feature is also maintained in the fast-forward/fast-reverse modes. The speed in this mode accumulates to ten times sound speed. This means that 1,200 feet of film or a half-hour program can be rewound in less than three minutes.

QUIETNESS OF OPERATION

At any speed the unit is exceptionally quiet. Therefore, the true quality of dialogue, music and effects can be determined with no mechanical noises to distract. With the use of special small pitch "toothed belts" and sprocket pulleys, the usual gear meshing noises have been eliminated. The unit is once again exceptionally quiet even when the film is traversing at ten times sound speed.

MOVIOLA "COMPOSITE TOOLING" SYSTEM

With the advance change from upright to the horizontal editing, it has been necessary to design a complete new system of production tooling. Consistent with the design concept,



parts have been tooled for precise interchangeability, plus many new materials have been utilized. Although some parts are subject to wear and replacement, the use of composite tooling has minimized the installation time within the field.

Since the console has mobility, it is moved down an assembly line and components are added from station to station to a final sound-proof testing room. Although each assembly was separately pretested, a final "composite

test" is made by operating the complete system.

Moviola has just passed the 50 year mark of service to the motion picture and television industries. This composite background of experience is now consummated by our pledge to continue this service for the next 50 years through research and development of new products designed to meet the rapidly expanding industry requirements.

SPECIFICATIONS MOVIOLA CONSOLE EDITOR

PICTURE HEAD: One "Synchroprism" projection head with "DUAL" sprocket "Servo-Tach" drive system. Picture screen 8½ x 11½".

THREADING: Dual sprockets with "calibrated loop setting" for proper film tension over picture aperture and MAG Heads. "Full vision" film path for "micro-inching" of sync marks.

SOUND HEADS: Two 16mm edge track or center track SMPTE or CCIR equalization.

COMPOSITE SOUND HEAD: One optical reproduce head equalized and adjusted to SMPTE standards test films; frequency response 50 to 7,000 cycles, + or - 2 db. One magnetic reproduce head for "single system" sound reproduction. Azimuth and frequency response characteristics same as edge/center track sound heads.

SERVO-TACH DRIVE SYSTEM: The picture head and two sound heads are each driven by separate Moviola servo-tach interlock motors. A crystal controlled frequency source provides the primary speed rate of 24 FPS regardless of the external input frequency (50 or 60 cycles). A selector switch can change the film sync speed rate from 24 to 25 FPS. Push buttons are used for instant sound speed, start, stop, whereas a master rotary control will traverse the picture and sound interlocked from three FPS to 240 FPS (ten times sound speed) forward or reverse.

SELECTIVE RAPID FAST-FORWARD-REVERSE: The picture head and two sound heads may be selectively programmed for rapid forward or rapid reverse. Alternately either or both sound heads may be placed in "rapid" while the picture is in motion at sync. speed.

ELECTRONIC DIFFERENTIAL: Picture and two sound heads can be selectively programmed for coupling and decoupling from the "lock" mode, for marking, viewing and precise listening purposes. Correspondingly, each sound head may be decoupled for variable speed film movement.

ADVANCE/RETARD: The film while traversing through either of the sound heads can be precisely advanced or retarded. Two push buttons control this function at a rate of 4 FPS.

CHRONO-TACH READOUT SYSTEM: Readout display is six digits; two digits for frame and seconds count and four digits for footage and minutes. Advance/retard display — four digits (2 per sound head) with up/down counter for + or - readout. Footage computer counts forward or reverse; add or subtract. Seconds and minutes readout capability is alternate with frames footage display. Logic system of counter-computer converts frame count to seconds and feet count to minutes, and will store and selectively display footage or time count and is functional in forward or reverse modes.

DISPLAY MEMORY: After initial selection, system will retain the computed information on display until the counter is manually reset.

AUDIO SYSTEM: Solid state electronics using integrated circuit amplifiers for reproduce preamps and monitor amplifier.

HIGH/LOW EQUALIZATION: Independent equalizers with boost and attenuation for both high and low frequencies. Equalizers have "zero loss" characteristics at zero setting.

AUDIO MIXING: Each of the two sound heads, the optical head, and the single system magnetic head have separate amplifiers and slide attenuators for adjusting output levels. A master gain control adjusts levels from a selective "mix" into the monitor amplifier.

FREQUENCY RESPONSE: "MAG" 50 to 10,000 cycles + or - 2 db. Units tested with SMPTE or CCIR multi-frequency standard films.

MODULAR COMPOSITE DESIGN: 16mm and 35mm sound heads are interchangeable, speed and counter control circuit are programmed by the sound heads. The circuit automatically compensates for the torque and speed differences between 16mm and 35mm film.

OUTPUTS: Two speakers self-contained in the screen enclosure, or an external speaker plus one headphone output monitor jack.

POWER REQUIREMENTS: 115 volt 50 or 60 cycle, 230 v., 50 or 60 cycle operation. A crystal controlled frequency source provides the primary speed rate of 24

f.p.s. regardless of the external input frequency (50 or 60 cycles). A selector switch can change the film sync speed rate from 24 to 25 f.p.s.

POWER CONSUMPTION: 1,200 watts maximum for picture and 35mm sound heads.

SIZE: Console length — 61"; depth — 36", including picture screen enclosure — 32" with screen enclosure re-

moved; height from bottom of console to top of reel spindles — 9½"; console height with pedestals in upright position — 30" to splicing and control position; 32" to film handling turntables. Weight of entire console, including fold-up pedestal assemblies and speaker enclosures — approximately 400 lbs.

SHIPPING WEIGHT: Domestic or overseas weight 445 lbs.

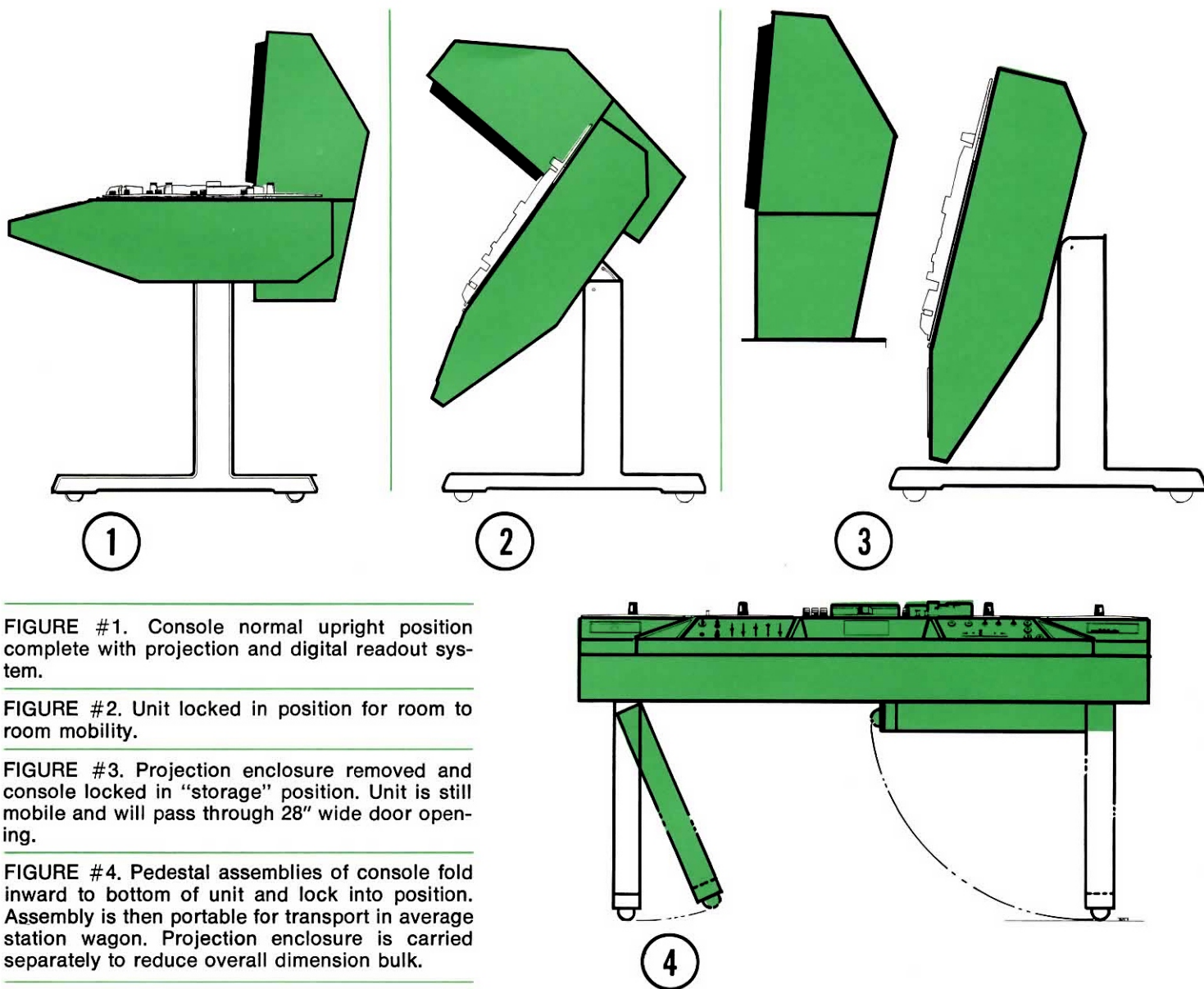


FIGURE #1. Console normal upright position complete with projection and digital readout system.

FIGURE #2. Unit locked in position for room to room mobility.

FIGURE #3. Projection enclosure removed and console locked in "storage" position. Unit is still mobile and will pass through 28" wide door opening.

FIGURE #4. Pedestal assemblies of console fold inward to bottom of unit and lock into position. Assembly is then portable for transport in average station wagon. Projection enclosure is carried separately to reduce overall dimension bulk.

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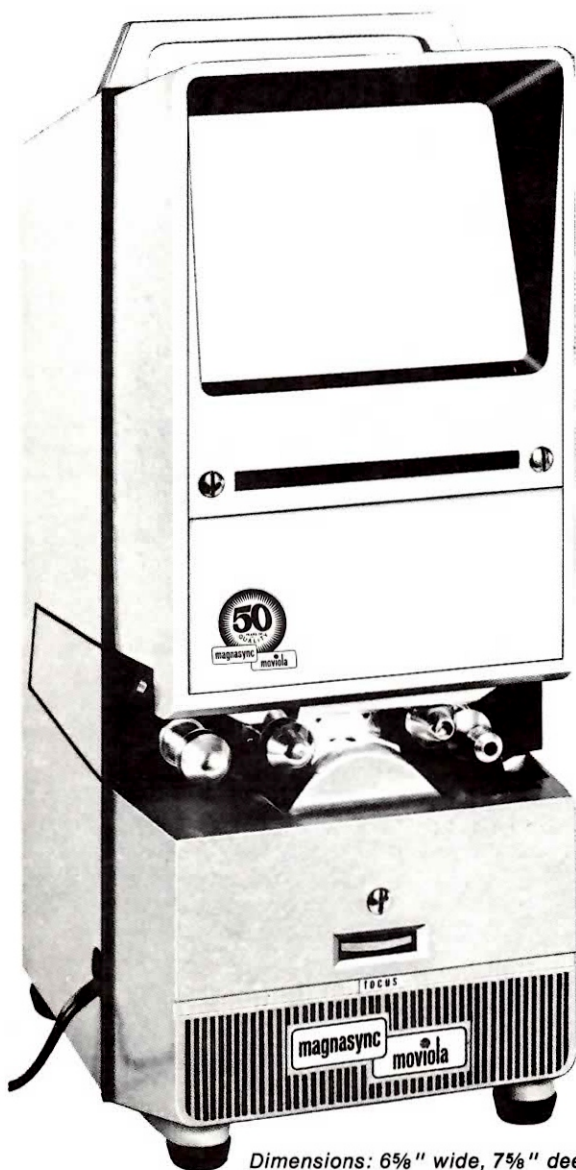
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"MOVIOLA 50"

PROFESSIONAL 16mm TABLE VIEWER



Dimensions: 6 $\frac{1}{2}$ " wide, 7 $\frac{1}{2}$ " deep,
14 $\frac{1}{2}$ " high Screen, 5" wide.

Representing fifty years of experience in the field of editing, it is engineered to provide maximum operator comfort and efficiency. All parts are easily accessible for instant serviceability.

It accepts a standard version 16MM film, from left to right sprocket holes back. Its most outstanding feature is an eight-sided precision optical prism which gives a steady, flicker free picture. The high quality six-element lens projects a clear image, which remains sharp whether film is moving or stopped.

Ball Bearings on prism and sprocket allow the film to be pulled through up to five times the sound speed without scratching the surface or damaging the sprocket holes. Another feature is the quick load and unload capability. The film is clamped to the sprocket, not to lose sync. The same clamping motion relocates the guide rollers for quick, straight line loading or unloading. The open position of the clamp switches the projection lamp off.

The viewer can be used in connection with a Magnasync/Moviola Synchronizer to produce optical or magnetic sound on the same strip as the picture or in synchronization with a separate tape. The synchronizer can be equipped with footage/frame or timer counter. This viewer can be adapted with a magnetic head to pick up sound at the projected frame, which makes single-system editing possible when used with a Magnasync/Moviola Displacement Recorder, DR-1.

"In line" editing eliminates "lip flap" and unwanted or unassociated picture sound. The viewer is equipped with a standard wide-angle screen or with a fresnel lens screen offering concentrated corner to corner brightness.

For very bright editing rooms, a slip-on hood is available.



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5539 Riverton Ave., No. Hollywood, Calif. 91601
Telephone: (213) 877-2791**STUDIO PRICE LIST No. 166****EFFECTIVE**
APRIL 1, 1970All prices herein are Professional Users' Net, F.O.B. factory in North Hollywood, California, U.S.A.
Prices are subject to change without notice.

CATALOG PAGE NO.	PART NUMBER	DESCRIPTION	UNIT PRICE
3	2216-E-7	16mm, Edge Track, w/Monitor Amp & Spkr, w/4 Channel Mixer	\$ 2,775.00
3	2216-C-7	16mm, Center Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,775.00
3	2216-R-7	16mm, Release Print, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,975.00
3	2217-A-7	17.5mm, ASA Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,875.00
3	2235-A-7	35mm, ASA Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,875.00
	2216-E-6	16mm, Edge Track, w/Mon. Amp & Spkr	2,425.00
	2216-C-6	16mm, Center Track, w/Mon. Amp & Spkr	2,425.00
	2216-R-6	16mm, Release Print, w/Mon. Amp & Spkr	2,625.00
	2217-A-6	17.5mm, ASA Track, w/Mon. Amp & Spkr	2,525.00
	2235-A-6	35mm, ASA Track, w/Mon. Amp & Spkr	2,525.00
5	2216-E-4	16mm, Edge Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,595.00
5	2216-C-4	16mm, Center Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,595.00
5	2216-R-4	16mm, Release Print, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,795.00
5	2217-A-4	17.5mm, ASA Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,695.00
5	2235-A-4	35mm, ASA Track, w/Mon. Amp & Spkr, w/4 Channel Mixer	2,695.00
5	2216-E-3	16mm, Edge Track, w/Mon. Amp & Spkr	2,245.00
5	2216-C-3	16mm, Center Track, w/Mon. Amp & Spkr	2,245.00
5	2216-R-3	16mm, Release Print, w/Mon. Amp & Spkr	2,445.00
5	2217-A-3	17.5mm, ASA Track, w/Mon. Amp & Spkr	2,345.00
5	2235-A-3	35mm, ASA Track, w/Mon. Amp & Spkr	2,345.00
5	2216-E-2	16mm, Edge Track, Rec/Repro. for rack mounting	2,095.00
5	2216-C-2	16mm, Center Track, Rec/Repro. for rack mounting	2,095.00
5	2216-R-2	16mm, Release Print, Rec/Repro. for rack mounting	2,295.00
5	2217-A-2	17.5mm, ASA Track, Rec/Repro. for rack mounting	2,195.00
5	2235-A-2	35mm, ASA Track, Rec/Repro. for rack mounting	2,195.00
6	2216-E-33	16mm, Edge Track, Triple Repro. electrically interlocked	5,995.00
6	2216-C-33	16mm, Center Track, Triple Repro. electrically interlocked	5,995.00
6	2217-A-33	17.5mm, ASA Track, Triple Repro. electrically interlocked	6,195.00
6	2235-A-33	35mm, ASA Track, Triple Repro. electrically interlocked	6,195.00
6	101197	Inching Knob, 16mm	149.00
6	101191	Inching Knob, 35mm	174.00
7	2216-E-22	16mm, Edge Track, Double Repro. electrically interlocked	4,180.00
7	2216-C-22	16mm, Center Track, Double Repro. electrically interlocked	4,180.00
7	2217-A-22	17.5mm, ASA Track, Double Repro. electrically interlocked	4,380.00
7	2235-A-22	35mm, ASA Track, Double Repro., electrically interlocked	4,380.00

CATALOG PAGE NO.	PART NUMBER	DESCRIPTION	UNIT PRICE
7	2216-E-11	16mm, Edge Track, Single Repro. for rack mtg	\$ 1,850.00
7	2216-C-11	16mm, Center Track, Single Repro. for rack mtg	1,850.00
7	2216-R-11	16mm, Release Print, Single Repro. for rack mtg	2,050.00
7	2217-A-11	17.5mm, ASA Track, Single Repro. for rack mtg	1,950.00
7	2235-A-11	35mm, ASA Track, Single Repro. for rack mtg	1,950.00
7	2216-E-11-1	16mm, Edge Track, Single Reproducer for rack mtg	1,325.00
7	2216-C-11-1	16mm, Center Track, Single Reproducer for rack mtg	1,325.00
7	2216-R-11-1	16mm, Release Print, Single Reproducer	1,525.00
7	2217-A-11-1	17.5mm, ASA Track, Single Reproducer	1,425.00
7	2235-A-11-1	35mm, ASA Track, Single Reproducer	1,425.00
8	2300-R	Displacement Recorder, solid state	2,495.00
9	Model "50"	16mm Table Viewer	325.00
	Model "50"	16mm Table Viewer with mag attachment (L to R only)	375.00
	Model URS	Amplifier	72.00
10	2516-E-N	Transfer System, 16mm, Edge Track	4,650.00
10	2516-R-N	Transfer System, 16mm, Release Print	4,850.00
10	2517-A-N	Transfer System, 17.5mm, ASA Track	4,750.00
10	2535-A-N	Transfer System, 35mm, ASA Track	4,750.00
11	X-400-E-15	16mm, Edge Track, Vacuum Tube Rec/Reproducer	1,895.00
11	X-400-C-15	16mm, Center Track, Vacuum Tube Rec/Reproducer	1,895.00
11	X-400-R-15	16mm, Release Print, Vacuum Tube Rec/Reproducer	1,995.00
12	* Model 962	Studio Mixing Console, solid state	5,255.00
13	Model G-963	Mixing Console, vacuum tube	2,695.00
	G-967 R	Right Hand Extension for Console	190.00
	G-967 L	Left Hand Extension for Console	190.00
	S-801	Microphone Preamplifier	120.00
	G-970	Talk Back Microphone	150.00
	G-971	Cueing Oscillator	95.00
14	250	Four Channel Portable Microphone Mixer, solid state	795.00
15	230	Four Channel Mixer for Nagra Recorder, solid state	395.00
	240	Four Channel Mixer Module for Recorder, solid state	350.00
21	M-430	Interlock Motor, 220 V, 3 phase	415.00
21	M-431	Interlock Motor, Heavy Duty, 110 V, 1 Phase	360.00
21	M-432	Interlock Motor, 110 V, 1 phase	360.00
21	M-433B	Sync Selsyn Interlock Attachment, Bell & Howell Proj.	595.00
21	M-433BS	Sync Selsyn Interlock Attachment, Bell & Howell Spec.	750.00
21	M-434B	Interlock Motor Attachment, Bell & Howell Proj.	435.00
21	M-434BS	Interlock Motor Attachment, Bell & Howell Spec.	600.00
21	M-434D	Interlock Motor Attachment, DeVry Projector	425.00
21	M-434G	Interlock Motor Attachment, Graflex Projector	435.00
21	M-434J	Interlock Motor Attachment, B & H Jan Projector	520.00
21	M-434P	Interlock Motor Attachment, Pageant Projector	410.00
21	M-437	Interlock Motor Relay	35.00
21	M-437X	Interlock Motor Relay	45.00
21	M-439	Remote Footage Counter	595.00
	M-440	Projector Control Relay	65.00
21	M-480 A	Interlock Motor Attachment for X-400 Type 15	375.00
22	M-782	Sync Selsyn Control Box	110.00
22	M-784	Sync Selsyn Control Box	260.00
	CP-350	New Distributor Control Panel	395.00
	M-371	Distributor, 1/2 HP Drive	850.00
	M-370	Distributor, 110 V, 1 phase, 1/4 HP Drive	625.00

CATALOG PAGE NO.	PART NUMBER	DESCRIPTION	UNIT PRICE
22	S-235	Interlock Motor Kit for 2200 Series	\$ 380.00
22	SP-60SS	Solid State Sync Pulse Amplifier	685.00
24	H-2ER	Magnetic Record Head, Edge Track, 16mm	55.00
24	H-2CR	Magnetic Record Head, Center Track, 16mm	55.00
24	H-1R	Magnetic Record Head, Release Print, 16mm	75.00
24	H-2EP	Magnetic Play Head, Edge Track, 16mm	55.00
24	H-2CP	Magnetic Play Head, Center Track, 16mm	55.00
24	H-1P	Magnetic Play Head, Release Print, 16mm	75.00
24	H-2EX	Magnetic Erase Head, Edge Track, 16mm	55.00
24	H-2CX	Magnetic Erase Head, Center Track, 16mm	55.00
24	H-1X	Magnetic Erase Head, Release Print, 16mm	75.00
24	H-1XSS	Release Print/Erase Head for DR-1	75.00
24	H-2R7	Magnetic Record Head, Single Channel, 17.5mm	55.00
24	H-2P7	Magnetic Play Head, Single Channel, 17.5mm	55.00
24	H-2X7	Magnetic Erase Head, Single Channel, 17.5mm	55.00
24	H-A1R	Magnetic Record Head, Single Channel, 35mm	75.00
24	H-A1P	Magnetic Play Head, Single Channel, 35mm	75.00
24	H-A1X	Magnetic Erase Head, Single Channel, 35mm	75.00
24	H-A3R	Magnetic Record Head, Three Channel, 35mm	250.00
24	H-A3P	Magnetic Play Head, Three Channel, 35mm	250.00
24	H-A3X	Magnetic Erase Head, Three Channel, 35mm	250.00
24	X-45-H-E	X-400 Series Rec. Plug-in Head Assy, Edge Track	195.00
24	X-45-H-C	X-400 Series Rec. Plug-in Head Assy, Center Track	195.00
24	X-45-H-R	X-400 Series Rec. Plug-in Head Assy, Release Print	225.00
24	X-46-H-E	602 Series Recorder Plug-in Head Assy, Edge Track	195.00
24	X-46-H-C	602 Series Recorder Plug-in Head Assy, Center Track	195.00
24	X-46-H-R	602 Series Recorder Plug-in Head Assy, Release Print	225.00
24	X-47-H	702 Series Recorder Plug-in Head Assy	195.00
24	X-41-H	135 Series Recorder Plug-in Head Assy	225.00
2100 Series Recorders/Reproducers have the same model numbers as listed above with the addition of SS to signify use with solid state amplifiers.			
24	HMK 16	Head Mounting Hardware, 602 and 702 Series	5.00
24	HMK 35	Head Mounting Hardware, 135 Series	5.00
25	2-103556	Magnetic Record Head, Edge Track, 16mm, 2200 Series	70.00
25	2-103557	Magnetic Playback Head, Edge Track, 16mm, 2200 Series	70.00
25	2-103558	Magnetic Erase Head, Edge Track, 16mm, 2200 Series	75.00
25	2-103584	Magnetic Record Head, Center Track, 16mm, 2200 Series	70.00
25	2-103585	Magnetic Playback Head, Center Track, 16mm, 2200 Series	70.00
25	2-103586	Magnetic Erase Head, Center Track, 16mm, 2200 Series	75.00
25	2-103590	Magnetic Record Head, Release Print, 16mm, 2200 Series	85.00
25	2-103591	Magnetic Playback Head, Release Print, 16mm, 2200 Series	85.00
25	2-103592	Magnetic Erase Head, Release Print, 16mm, 2200 Series	90.00
25	2-103563	Magnetic Record Head, Single Track, 17.5mm and 35mm	85.00
25	2-103564	Magnetic Playback Head, Single Track, 17.5mm and 35mm	85.00
25	2-103565	Magnetic Erase Head, Single Track, 17.5mm and 35mm	90.00
25	2-103578	Magnetic Record Head, 3 Track, 35mm	275.00
25	2-103579	Magnetic Playback Head, 3 Track, 35mm	275.00
25	2-103580	Magnetic Erase Head, 3 Track, 35mm	275.00
25	HXK-1	Magnetic Erase Head Kit, 16mm, Edge Track	82.00
25	HXK-2	Magnetic Erase Head Kit, 16mm, Center Track	82.00
25	HXK-3	Magnetic Erase Head Kit, 16mm, Release Print	112.00

CATALOG PAGE NO.	PART NUMBER	DESCRIPTION	UNIT PRICE
25	HXK-4	Magnetic Erase Head Kit, 17.5mm, 35mm, Single Track	112.00
25	HXK-5	Magnetic Erase Head Kit, 35mm, Three Track	282.00
26	2241	Record/Reproduce Amplifier	\$ 790.00
26	2244-1	Reproduce Amplifier, Single Channel	650.00
26	2244-2	Reproduce Amplifier, Two Channel	730.00
26	2244-3	Reproduce Amplifier, Three Channel	810.00
26	2244-4	Reproduce Amplifier, Four Channel	890.00
26	2251	Monitor Amplifier and Speaker	150.00
	2-103127	Output Transformer	34.65
26	PS22	Power Supply	42.00
26	OSC22	Bias Erase Oscillator	58.00
26	RE22	Record Amplifier	55.00
26	LA22	Line Amplifier	45.00
26	PB22	Playback Amplifier	45.00
27	B-37	Head Set	75.00
27	EV Sentry I	Studio Monitor Speaker, wall or ceiling mounting	200.00
27	EV Sentry II	Studio Monitor Speaker, floor model	215.00
27	PA-40	Power Amplifier	225.00
27	PA-40R	Power Amplifier, Rack Mounted	275.00
27	F-2	Test Film, Ctr Track Azimuth, 100' roll	25.00
27	F-4	Test Film, Ctr Track, Multi-freq., 200' roll	50.00
27	F-4X	Test Film, Ctr Track, 16mm, Multi-freq.	50.00
27	F-5	Test Film, 17.5mm azimuth, 100' roll, 90 fpm	50.00
27	F-6	Test Film, 17.5mm multi-freq., 300' roll, 90 fpm	50.00
27	C-45	Cable, microphone, 25 feet	15.00
27	C-45X	Cable, microphone, 50 feet	17.00
27	C-46	Cable, Interlock Motor, less connectors, 50 feet	20.00
27	M-76A	Split Reel, 400 ft., 16mm	9.75
27	M-77B	Split Reel, 1200 ft., 16mm and 17.5mm	13.75
27	M-35B	Split Reel, 1200 ft., 35mm	19.65
27	M-78	Large Hub, for 16mm split film reels	2.50
27	M-79	Large Hub, for 35mm split film reels	3.95
27	R-77	Rack Cabinet, deluxe enclosed 19" x 77" panel space	135.00
27	R-61	Rack Cabinet, deluxe enclosed 19" x 61 3/4" panel space	135.00
27	R-42	Rack Cabinet, deluxe enclosed 19" x 42" panel space	125.00
28	G-801	Single Program Equalizer	245.00
28	G-803	Triple Program Equalizer	550.00
28	A-937	Semi-Automatic Bulk Eraser	375.00
28	G-936	Professional Bulk Eraser	110.00
29		Microphone prices available upon request	



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